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Vol. XII—No. 12
March, 1931

THE PAPER INDUSTRY

A. SCOTT DOWD
Editor

A MONTHLY EDUCATIONAL JOURNAL
Devoted to the Interests of the Pulp and Paper Industry
THOMAS J. KEENAN, Associate Editor, 18 East 41st Street, New York City

MEMBER AUDIT BUREAU OF CIRCULATIONS

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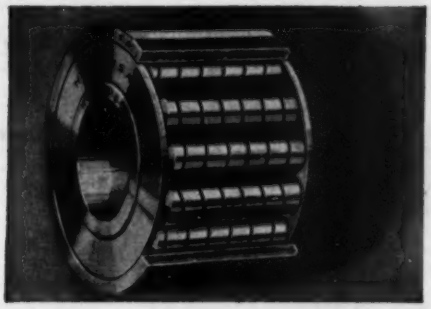

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To safeguard the longevity and operating satisfaction of production equipment is just as important as insurance. Without either, possible loss of profit may become a stark reality.

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Airview of the Champion Coated Paper Co. Mills, Hamilton, Ohio.

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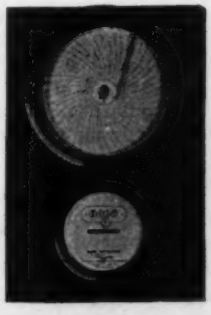
THE Champion Coated Paper Company, as a result of the vision and initiative of its executives, developed a program of research, mechanical and chemical, which has not only increased the quality of its products, but has lowered production costs.

As an example, when river water has been pumped, treated and filtered, it has become a valuable commodity to be used as economically as possible. Every time a gallon of water or a pound of steam is saved, or every time low pressure exhaust can be substituted for high pressure steam, it means a reduction in power costs.

The first step was to determine the quantity required in process work. Twenty-four Republic Flow Meters were installed to provide a means for accumulating and analyzing such figures.

In the boiler room, Republic Meters were installed on the new high pressure boiler as an aid to its efficient operation.

Modern paper making requires scientific cost control. Water and steam costs are very important and costly items. Republic Flow Meters provide the accurate information needed to insure efficient use of these two items.



Write for Bulletin "Controlling the Use of Steam and Water in Paper Mills"

REPUBLIC FLOW METERS COMPANY

Executive Offices and Plant: 2210 Diversey Parkway, Chicago, Illinois

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Dominion Flow Meters Co., Toronto, Canada Electroflo Meters Co., London, Eng.

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FLOW METERS

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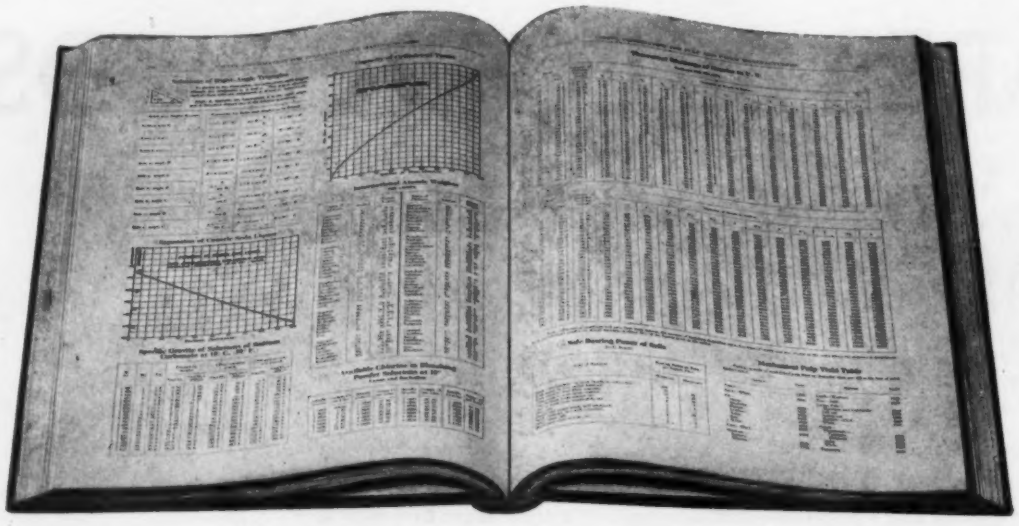


AN OPEN BOOK

The Paper and Pulp Mill Catalogue holds within its covers a multitude of secrets for every pulp and paper mill production executive. All of the secrets are arranged conveniently for ready reference.

The secrets include a very extensive index of equipment and supplies together with a list of representative manufacturers. Many of the equipment and supply items are described in detail in the advertising section of the book.

In addition to this vast amount of material, is also a trade name index to aid the production, purchasing, or engineering executive who knows the trade name of any desired product but has forgotten or does not know the manufacturer; a comprehensive list of books on papermaking and allied subjects which will supply the earnest seeker after truth with information on this important industry; and many pages of special engineering information obtained from a wide variety of sources and compiled to serve the engineer and production executive. Other data of importance is also included.

All of this material becomes an Open Book to the pulp and paper mill production executive who uses this catalogue.

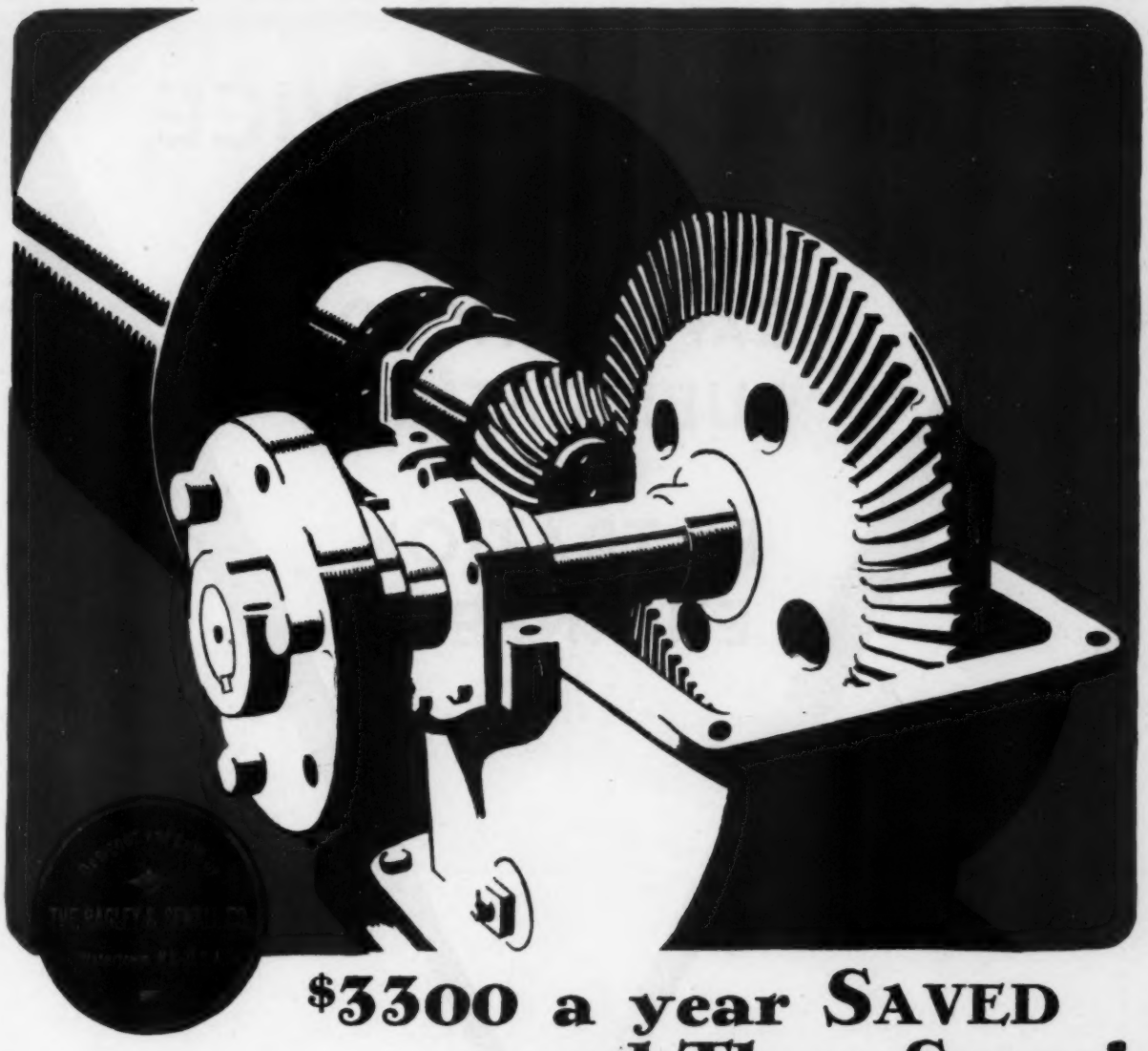
Save time, worry, and money by referring to the Paper and Pulp Mill Catalogue when in need of information.

This catalogue is published annually and is distributed gratis to key executives in the pulp and paper mills of the United States and Canada. Are you as a key executive in your mill receiving a copy? If not, inform us so that your name may be placed on the selected list for the 1931 edition now in preparation.

Address all communications to the

PAPER AND PULP MILL CATALOGUE

333 N. Michigan Avenue Chicago, Illinois



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Progressive industry isn't content to sit back and bemoan depression. It goes aggressively out after every scrap of business in sight,—and then handles it *profitably* by eternal internal efficiency.

(Moral,—if you need one),—The drive is a good place to start in "setting your house in order",—and Bagley & Sewall Drives are wonderful aids to cost-cutting, profitable production.

We'd like to tell you all about them,—write us.

The Bagley & Sewall Co.

Watertown, N.Y.

55

AT YOUR SERVICE

A CORPS OF EXPERIENCED LUBRICATION AND FILTRATION ENGINEERS

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HOOKER CHEMICALS

5325

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an Improved Chrome Brick for Kraft Smelter Linings

The production of your Kraft smelters depends to a great extent on the service life of the refractory lining.

"Lavino" Chrome Brick have fully demonstrated their ability to give unusually long service life in Kraft smelter linings. However, we were convinced that a Chrome Brick could be produced which would give even longer service life.

After two years intensive research work, we offer to the Kraft paper industry an Improved "Lavino" Chrome Brick, especially developed for Kraft smelter linings.

Briefly, the Improved Chrome Brick has the following advantages:

Greater resistance to penetration of destructive elements.

Less spalling and cracking. (Tests show the spalling loss of these Improved Brick to be 75% less than that of any other Chrome Brick.)

Higher hot load strength.

Much greater resistance to abrasion and erosion.

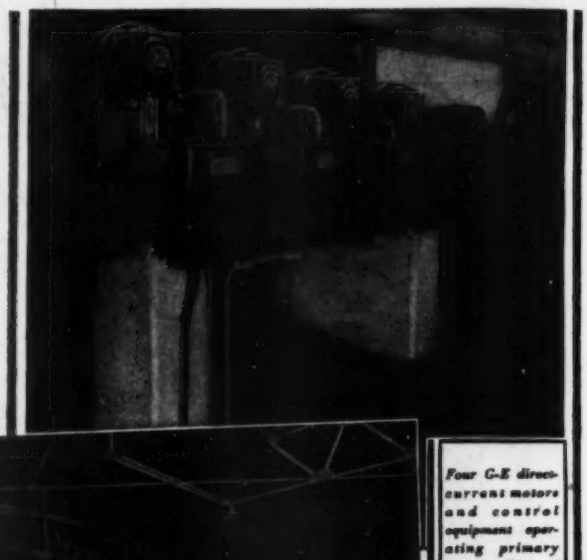
Improved "Lavino" Chrome Brick are made from the highest grade refractory Chrome Ore obtainable,—and are burned in continuous tunnel kilns.

Write for samples and further information

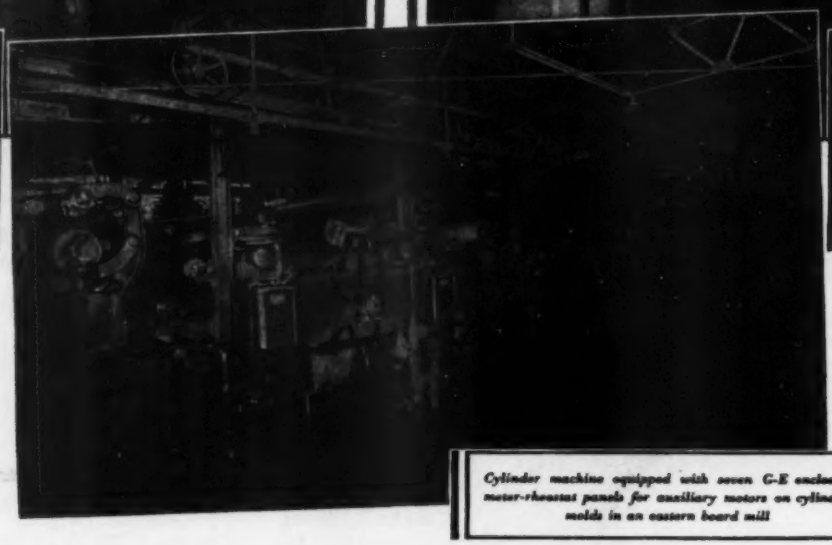
Pioneers in Chrome Refractories

E. J. LAVINO AND COMPANY
REFRACTORIES DIVISION
CHROME, MAGNESITE AND SILICA REFRACTORIES
BULLITT BUILDING PHILADELPHIA

Seven G-E direct-current motors driving cylinder molds. Part of electric wet-end equipment in an eastern board mill



Four G-E direct-current motors and control equipment operating primary presses. Part of electric drive in an eastern board mill



Cylinder machine equipped with seven G-E enclosed motor-rheostat panels for auxiliary motors on cylinder molds in an eastern board mill

Motorize the Wet End —and Save the Felt

IN spite of the tempting economies realized with electric sectional drive, it is not always economical or advisable to scrap existing mechanical equipment.

G-E engineers have designed and applied for the first time a practical electric aid to the mechanical drive. Suitable G-E motors are added to the primary press rolls and cylinder molds. These motors receive power from a direct-current generator, which is belted to the backline shaft and supplied with constant field excitation. Acceleration is even—felt strain is minimized—economy results.

Possibly there exists in your plant a similar condition with backline too valuable to scrap. Ask the nearest G-E office to tell you more about General Electric's solution of this problem.

JOIN US IN THE GENERAL ELECTRIC PROGRAM, BROADCAST EVERY SATURDAY EVENING ON A NATION-WIDE N.B.C. NETWORK

237-42

GENERAL ELECTRIC

SALES AND ENGINEERING SERVICE IN PRINCIPAL CITIES

Link-Belt Positive Drives
— *from Stock*

LINK-BELT Silent Chain and Roller Chain Drives for the efficient and positive transmission of power can be obtained from stock, nationally.

SILENT CHAIN DRIVES

For high speed power transmission. 98.2% efficient on actual test. Made in sizes from ¼ to 1000 H. P. and over. Drives ½ to 60 H.P. in speed ratios of 1 to 1 up to 7 to 1 carried in stock by distributors. Send for Data Book No. 125 and Pink Stock List No. 725.

ROLLER CHAIN DRIVES

For moderately high speed power transmission. Next in efficiency to Link-Belt Silent Chain. Drives up to 100 H. P. and over, in speed ratios of 1 to 1 up to 6¾ to 1 carried in stock by distributors. Send for Data Book No. 1257 and Green Stock List 1357.

Tried and proved in practically every character of service, these two types of drives are specified and bought today by the experienced users of power transmitting equipment. These drives are easy to install—are exceptionally long lived. They are not affected by atmospheric conditions, and they do not deteriorate when not in use.

Whatever your needs in power transmission may be, Link-Belt can help you solve your problem, and you can be certain that you are obtaining the drive that best meets your requirements.

A Link-Belt Positive Drive Specialist near you will give you unbiased advice as to the best type of drive for your particular needs. Send for catalogs.

Link-Belt Positive Drives

Include:—

Herringbone Gear Speed Reducers
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Malleable Iron, Promal and Steel Chain Drives
Silent Chain Drives
Roller Chain Drives
P. I. V. Gear (Variable Speed Transmission)

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LINK-BELT COMPANY

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H. W. Caldwell & Son Co., Chicago. 2410 West 18th Street

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That Simple Curve

makes all the difference in the world!

--and Here's the Reason

Each time a V-belt bends around its pulley, the top of the belt **narrows** and the bottom **widens,** while the sides of the belt **bulge out.**

FIG. 1

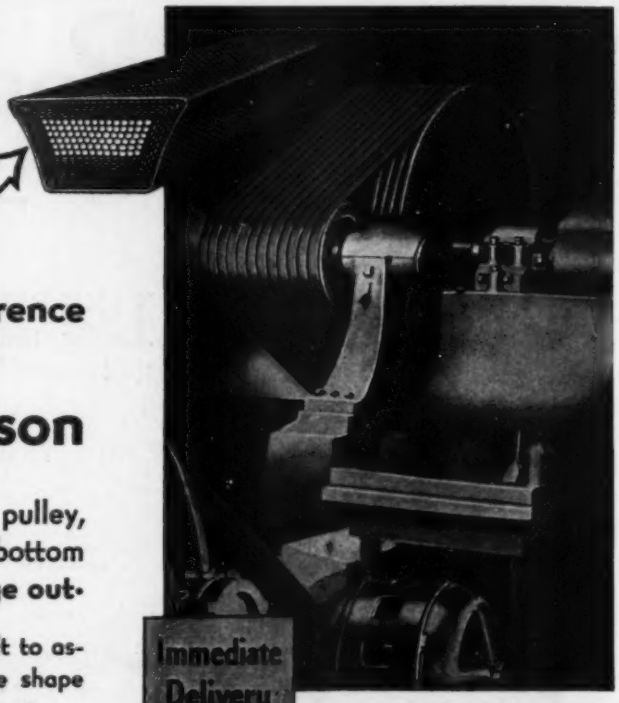
This forces a **straight-sided** belt to assume, in the sheave groove, the shape shown by the dotted lines in figure 1.

Consider what this means. (1) The bulging produces uneven wear on the sides of the belt and this means **shorter life!** (2) The full side of the belt does not uniformly grip the pulley--a definite loss in transmission efficiency.

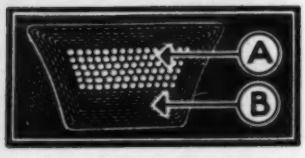
FIG. 2

How different the V-belt built with the precisely engineered **concave side** (patent pending)--the Gates Vulco Rope!

Bend this belt and you will see the **concave** side become **straight.** (Fig. 2). As it bends around its pulley, this belt assumes a shape that **exactly fits** the sheave groove. **Two advantages:** (1) Wear is evenly distributed over the entire side of the belt--**longer life!** (2) There is full side-width grip on the pulley --full delivery of power!



Immediate Delivery on Complete Drives 1/2 H.P. to 100 H.P.



Patented Construction—United States Patents 1,354,738 and 1,400,539 protect both the principle and the construction of a V-belt having a center of endless cords and a bias-cut cover.

Send for This Profit-Builder

A NEW BOOK ON TRANSMISSION

Without obligation, our engineering department is prepared to assist in designing a drive that efficiently meets your needs. This book, mailed free, will give you valuable information.

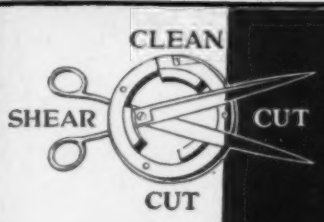
GATES VULCO ROPE

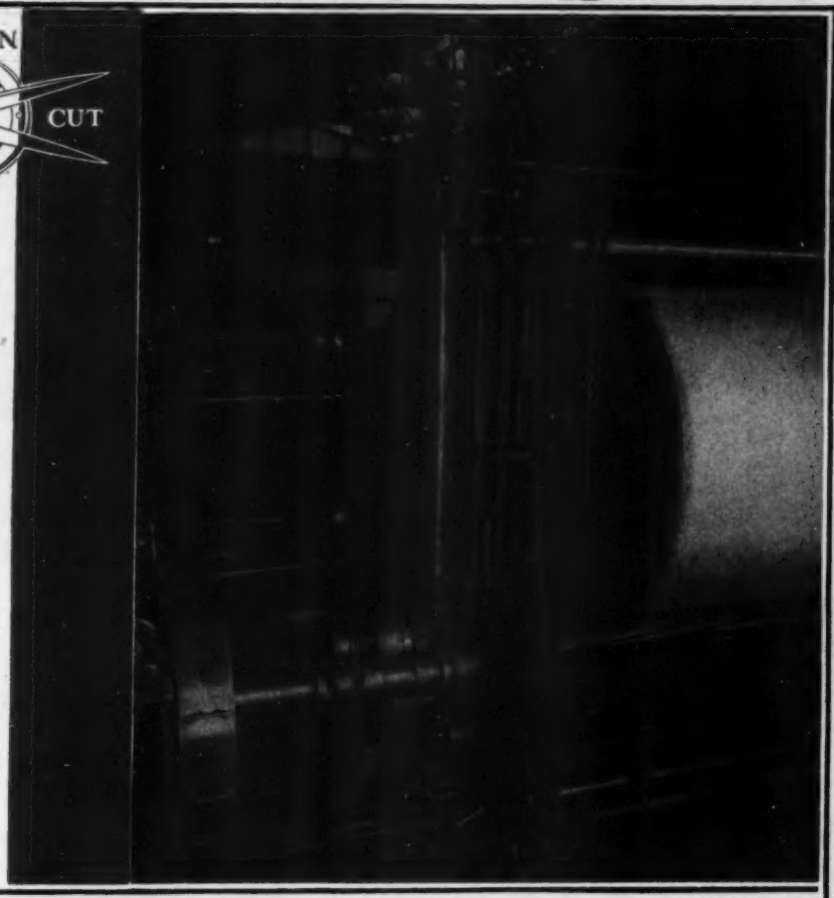
MULTIPLE V-BELT DRIVES

Manufactured by Gates Rubber Co., Denver, Colo.

"The World's Largest Manufacturer of V-Belts"

a clean cut ~ a sure cut ~ a shear cut ~ a clean cut ~ a sure cut ~ a shear cut ~ a clean cut ~ a sure cut ~ a shear cut ~ a clean cut ~ a sure cut ~ a shear cut ~ a clean cut ~ a sure cut ~ a shear cut ~





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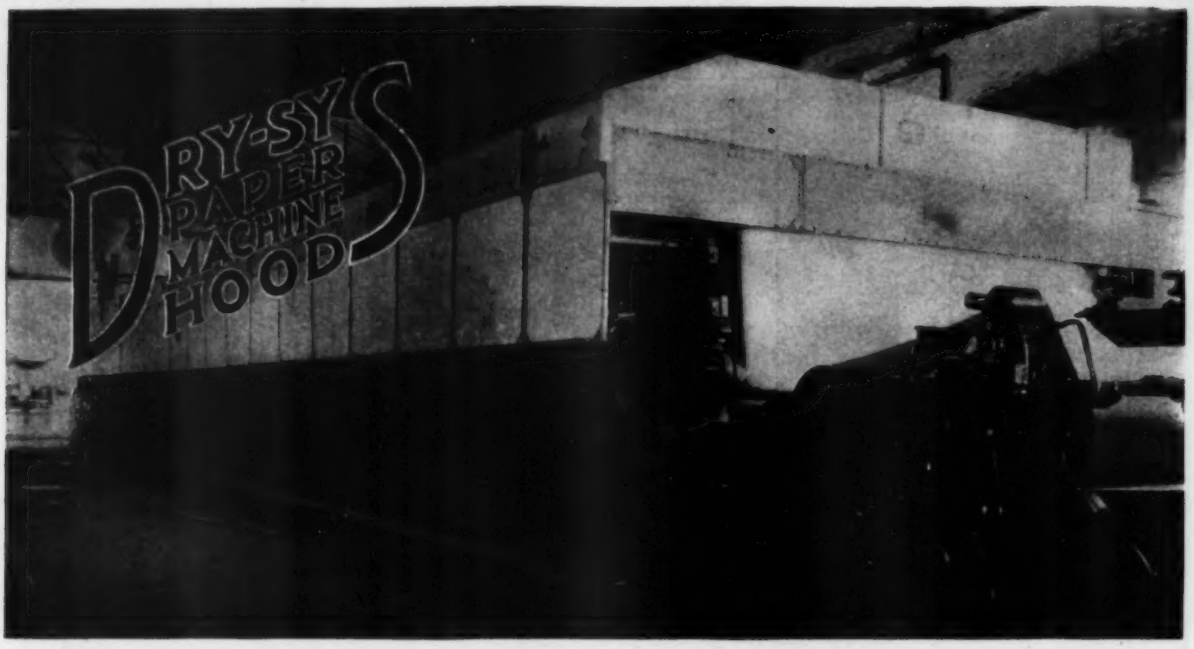
TYPES to meet every mill requirement; sizes from 30 inches to 165 inches—and wider. For more than twenty years Langston Slitters and Rewinders have been producing quality rolls. Uniformly square-edged, tightly wound, *free from dust*. Better your product—lower your manufacturing costs—by installing Langston Slitters. Others are doing it. Ask for catalog and further details.

SAMUEL M. LANGSTON COMPANY
Camden, New Jersey

a clean cut ~ a sure cut ~ a shear cut ~



THIS photograph, taken in mill of the Watab Paper Co., Sartell, Minn., is a typical installation of DRY-SYS (Sirocco Type) Paper Machine Hoods used in connection with a DRY-SYS Sirocco Cross Current Vapor Absorption System.

The hood consists of eleven hollow sections. Each section was completely fabricated in our shops, and shipped ready for installation with a minimum of shut down time.

DRY-SYS Paper Machine Hoods (Sirocco Type) fabricated, ready for shipment.

It is designed for easy access to the rolls and top of the machine through hinged curtains the entire length of the hood.

In operation it keeps the machine room free from vapor and eliminates condensation on ceiling and walls.

DRY-SYS Paper Machine Hoods are made up of standardized sections of either single thickness asbestos board construction, or in the hollow type illustrated above.

Either type is particularly advantageous in machine rooms with low ceiling height.

They have been installed for drying all weights of paper from light tissues to heavy boards. Your inquiries will be answered by engineers who have a practical knowledge of paper manufacture.

DRYING SYSTEMS, INC.

1826 Foster Avenue

CHICAGO » » ILLINOIS

Paper Broke

Humpty Dumpty sat on a wall,
Humpty Dumpty had a great fall;
All the King's horses and all the King's men
Couldn't put Humpty Dumpty together again.

WHAT'S that old Mother Goose rhyme got to do with the Paper Industry?

That's the question we asked of the friend who quoted it to us when we asked him what was the matter with the paper business.

Then, he went on and explained his poetic parable.

"Humpty Dumpty," he said, were the paper prices and they had fallen off the wall which was the stabilized price-level. The fall had been so great that there was no basic level to prices today—nobody seemed to know where the bottom was. All the king's horses and all the king's men were the big boys and executives in the paper business who controlled the destinies of the paper business and who had the making of prices in their hands. They were the ones that had toppled Humpty Dumpty off the stabilized wall.

All of their forces and all of their men
Could not put prices up again.

Then, he went on to say that it is just the easiest thing in the world for executives, who control any amount of tonnage, to put prices down. Any mill of any size, during demoralized times like these, can single-handed and alone cut their prices and thus bring down the whole level of prices. They need not ask the consent of any other mill in the industry about letting the prices down—all they have to do is to go out and make the so-called secret-behind-the-scene quotation, and then when the rest of the trade finds out that a cut in the price has been made, down they all go.

But how about putting them up again?

The mill or mills that inaugurate the price cuts, are as powerless to raise the prices as the king's horses and the king's men were to put Humpty Dumpty together again. Because no rise in paper prices can be made to-day by any one of the price-cutting mills—no matter how badly they may need it or want it—except that they have the consent of the rest of the mills in the industry.

We recently heard that one of the prime price-cutting mills wished to raise prices five to ten dollars per ton—but it just couldn't be done. Nobody had any confidence whatever in the integrity of the quotations made by the price-cutter, and when the suggestion became public property, the rest of the mills in the industry emitted a derisive guffaw,—they had been sufferers from the same kind of tactics many times before. And, said one of the large operators:

"We have no confidence in any quotations made by the prime price-cutters. Whatever price we find them to be selling paper for in the market, we will meet—no matter how low it may be—and there we will stay until the price gets lower."

Now, isn't that a funny fix
To find a fellow in?

And what comfort can the operators and executives in the seventh largest industry—the essential industry in the United States—obtain from conditions such as these?

The only little grain of comfort that we can

E D I T O R I A L

suggest to the reader of these lines, who perchance may be seized with a deficit-producing paper mill upon his hands, is this little couplet which we picked up at the annual paper convention held last week in New York. It runs like this:

"No matter if your mill be small,
And your rewards are few,
Just remember the sturdy oak
Was once a nut like you."

The State of Our Industry

AS might be expected at a meeting following one, a year ago, at which radical changes were made in the form of organization of the association, most of the officers' addresses and reports at this year's meeting of the American Paper and Pulp Association were devoted to accounts of the operation of the new system of management. In other columns of this month's issue of THE PAPER INDUSTRY, a general review is given of the activities of all associations which met in New York during Paper Week, March 16 to 19, but in place of reproducing there the complete texts of the presidential address by Mr. Willson and the annual report of General Manager Neal, we have thought it best to detach these from the news story of events and call attention in an editorial way to their chief features.

One of the impressive statements made by President Willson was concerned with the century-old custom of direct sales from mills to consumers, a system which has become complicated by the growth of distributors, or middlemen between distributors and users, all scrambling for their portion of direct sales. He did not suggest a remedy for this but left the subject for the consideration of members, remarking that a revision in the present methods of hand-to-mouth buying from the mills and in the distribution of paper products would be brought about in the natural course of events. It afforded him the opportunity to observe that the paper industry had been slow to recognize and to adopt some of the economic principles that had been applied to other lines.

A new thought was expressed by Mr. Willson in advocating the regulation of production as a means of eliminating cut-throat competition. What he said on this subject is deserving of reproduction in full. After stating his belief in the economies which would follow the formation of large units in industry and the transaction of mill and merchant business upon a larger scale and would at the same time be advantageous to consumers, he went on to say that manufacturers should not be called upon to perform the functions of the merchant as he is doing today, for "split into a thousand units, as we are, a competitive condition has developed which prevents stabilization and standardization of products and fair prices. The larger units—both manufacturing and distributing, if operated with honest management and with recognized business ethics applied, would be a protection not only to the consumer, but to the smaller independent units engaged in manufacturing or in distribution, through the elimination of cut-throat, destructive competition. In other words, industry must be of a bigness to match the bigness of the nation, with strong units to cope with the peaks and valleys in business through the regulation of production and stabilization of the markets."

President Willson, in common with the great majority of students of present-day conditions in the pulp and paper industry, is opposed to the construction of new mills in the face of the existing glut of production. In discussing this subject, he said: "We need controls in the expansion of equipment, just as badly as we today need control of production in order that it shall harmonize with consumption. We all know that during the past 15 years there has been great over-expansion, and that even in the face of that well-known fact, new mills have been and are still being erected, and aggravating an already serious situation.

"I am generally opposed to bureaucracy, and too many Government commissions controlling activities in industry, but some of them are of real value as restraining influences against destructive competition.

"I believe an industrial research commission, authorized by Congress, and acting under the supervision of the Department of Commerce could control excessive expansion with benefit to everybody, including the investing public. In effect it would be budgetary control. This commission should be vested with authority to issue permits for expansion projects that contemplated increased production of basic commodities having nationwide distribution, only after it shall be shown that the markets could absorb the additional production under healthy competitive conditions. It would stabilize production—prices and employment.

"The application of some such plan during the past few years would have smoothed out some of the peaks and valleys in business that have re-

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They bleach every commercial variety of chemical wood pulp; bagasse, bamboo and cornstalk fibres, and groundwood.

156 of our Bleaching Units are included in their equipment, arranged for several different methods of operation.

We would like to study *your* bleaching problem.

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200 Fifth Avenue **New York, N. Y.**

EDITORIAL

sulted from the law of the jungle which has been applied after the building of new mills and the installation of additional equipment, and which has been operative in some branches of our industry within the past few years, and particularly within the past two years.

"The five-day week has been suggested as a solution. Your association would welcome your views on this or any other industry problem, as it is obvious that in any industrial field, constructive thinking can not be limited to the opinion of any one man or any one corporation or association. Even with business active, there is at present over-capacity sufficient to care for normal increased consumption of three per cent annually for the next eight years, and it is to be hoped that any plans for expansion will not be approved without first taking this condition into consideration.

"I know the above suggestion is a plan not now permissible and at present seems radical, but isn't it worth thinking about—that or some other remedy? I am simply sowing seeds, knowing that some fall upon fertile ground and others upon barren soil. Progress is the outgrowth of thought, the expressions of which are oftimes considered radical, but when radicalism impels the serious thoughts of others—sane and practical remedies usually develop."

General Manager Neal said in his annual report that the association had not been negligent in preventing the building of new pulp and paper plants, but had insisted upon fair consideration of the principles enunciated by Dr. Virgil Jordan: "In the financing of specific enterprises and especially of mergers and consolidations, financial institutions appeared to be working in the dark, without regard to the conditions of industrial capacity, supply and demand in particular lines, which should be carefully studied before financing is undertaken."

The association has advised prospective builders of new mills that no such enterprise should be undertaken without a thorough investigation of present capacity, present consumption and probable trends of consumption. Mr. Neal asserted as a result of an investigation that in nearly all cases those who considered the erection of pulp and paper mills had focused attention upon production problems without thought of what was to be done with the products after they were made. That a salutary influence had been exerted by the association was reflected in the fact that all of the projects of this kind proposed during the past year had been abandoned.

Conditions in Canada

AS a mirror of business conditions in the Canadian newsprint paper industry, the annual financial statement of the Canada Power and Paper Company is considered especially dependable; as a means of determining the present status and market outlook, its publication is accordingly awaited with considerable expectancy.

Canada Power & Paper is an amalgamation of some of the largest pulp and paper companies in the Dominion, including the Anglo-Canadian Pulp and Paper Mills, Ltd., the Laurentide Company, Ltd., the St. Maurice Valley Corporation, Wayagamack Pulp and Paper Company, Ltd., Port Alfred Pulp and Paper Corporation and the Anticosti Corporation. In this year's financial statement, evidence is given of the difficult operating conditions which prevailed during the past year, when a serious overexpansion in mill capacity coincided with a decrease in consumption, the first year in a decade in which consumption had failed to show an increase. The working capital of the company has been enormously reduced, the sum reported being $11,470,712, as compared with $27,338,471 for the corresponding period of the previous year.

In this report to stockholders by President J. H. Gundy, it was stated that the operations of the corporation were at a rate of approximately 56 per cent of capacity in 1930, as against 77 per cent in 1929, and the indications were that consumption during the present year would mark a further decline, since operations to date were at the average rate of approximately 43 per cent.

The policy of aggressive building of new mills was scored by President Gundy, and it was somewhat of a coincidence that at the biennial convention of the Sulphite and Paper Mill Workers Union, which closed in Montreal the day before the issuance of the Canadian Power and Paper Company's annual financial statement, attention was called by President Burke of the Union to the fact that paper companies had been building too many mills and causing a great deal of unemployment owing to the total mill capacity being in excess of demand.

Almost alone among the paper industry periodicals of North America, THE PAPER INDUSTRY has for many months past published articles warning against the dangers of building new mills in excess of consumptive demand and it would appear that others are at last becoming alive to the grave financial risks involved.

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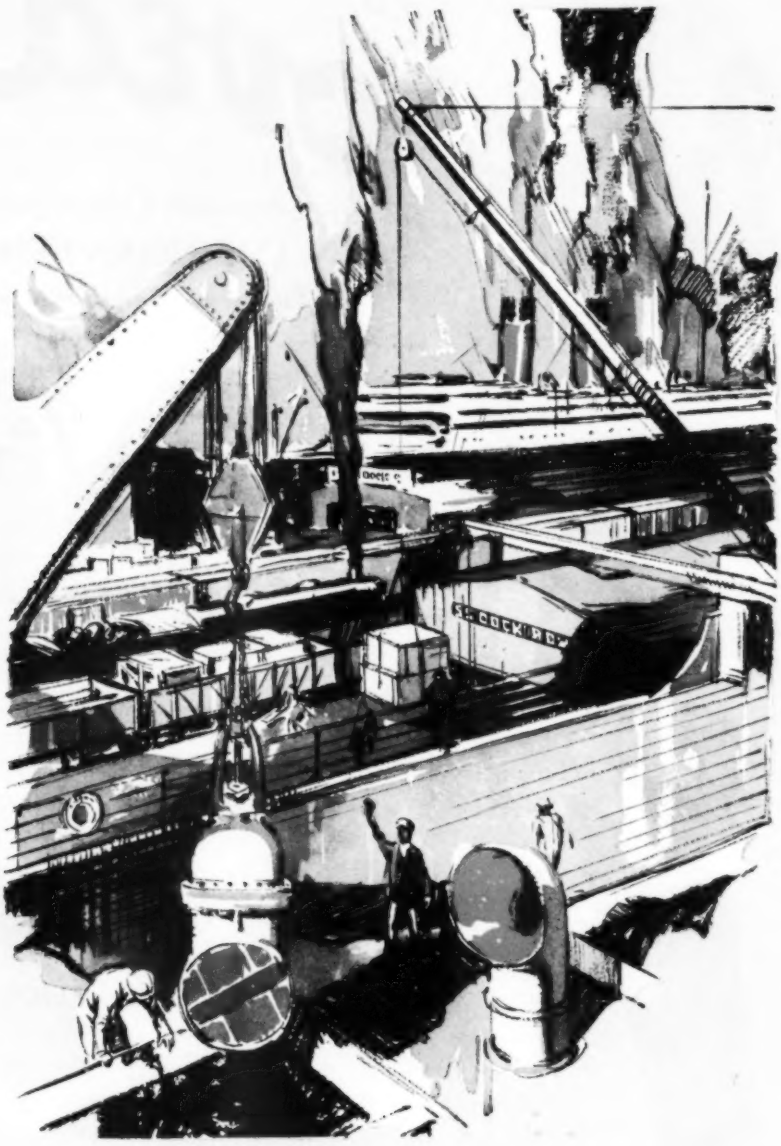

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PIPING MATERIALS TO CONVEY AND CONTROL STEAM, LIQUIDS, OIL, GAS, CHEMICALS

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In the great new power plant that serves the city of Buenos Aires, Crane valves and fittings are found in use. In the paper mills of Ontario and the water power developments of Niagara Falls, engineers swear by them. Camels carry them into the depths of the Abyssinian Desert and dog sledges into the wilds of Canada.

The quality of Crane piping materials has won them a world-wide demand. The globe-girdling Crane distributing organization has placed them within easy reach of power and industrial builders everywhere. Just as Crane materials have been developed and improved to meet every advancing demand of modern engineering, the Crane service of supply has been extended to follow the spread of modern industry.

Naturally, this distributing organization is most complete and efficient in the United States. In this country are factories in five cities manufacturing industrial piping materials; branches and sales offices in 160 cities; warehouses in close proximity to every important industrial center. All these facilities are keyed to receive orders for quickly needed materials and have them on the spot with no loss of time.

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PONSOL BLUE RP TRIPLE POWDER—*This product is very suitable for the tinting of whites and for light blue shades on bond, writing, envelope and other high-grade papers—also on specialties where fastness to light and other agents are essential.*

PONSOL VIOLET RRP POWDER—*A violet for use in the production of pinkish whites and as a shading color for Ponsol Blue RP Triple Powder.*

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Complete information is given in Bulletin No. 1228-J. May we send you a copy?

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Manufacturing Engineers

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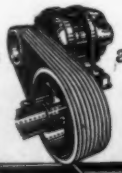

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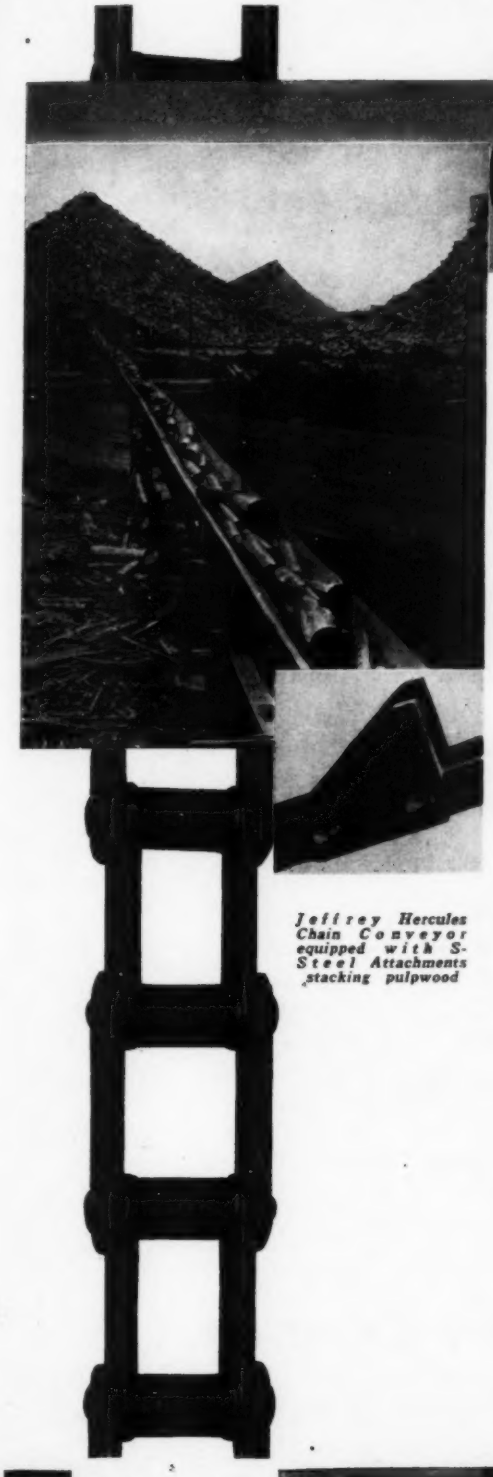

Jeffrey Hercules Chain Conveyor equipped with S-Steel Attachments stacking pulpwood

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That Reduces Handling Costs

Jeffrey Hercules Chain is unquestionably the most popular chain in the pulp and paper industry for use on chain conveyors handling pulpwood. It is also used extensively on bucket elevators and as a drive chain. It has won this enviable reputation strictly on merit.

The malleable block links of Jeffrey Hercules Chain have a hard skin for wear and a tough interior to withstand pounding. Steel strap links are assembled with *full diameter* D-shank pins which cannot turn in side bars. This confines the wear to the oval barrel which carries the greatest amount of metal exactly where the greatest wear occurs.

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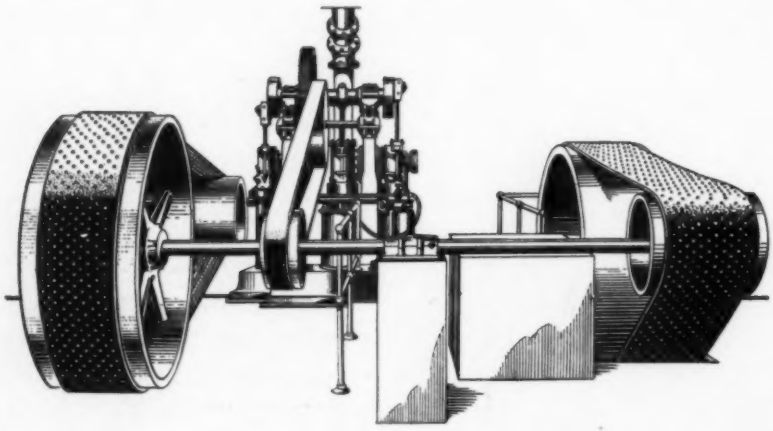

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"Operating for a year and are entirely satisfied with their (Tentacular) performance. Our beater drives require very severe service of a belt, and any other belt we have used has had to be taken up from time to time, whereas one of the TENTACULAR installations has been running a full year and has never been taken up in that time."

"This belt (Tentacular) replaced a 'V' type belt installation which we had on this drive. We had a considerable amount of trouble with this 'V' type belt drive on both slip and vibration. We also had trouble in blowing 400 amp. fuses. We are, indeed, more than pleased with the TENTACULAR Belt purchased. We must say that since we installed this type (Tentacular) belt, our belt troubles are over, and we cannot speak too highly of TENTACULAR."

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Here is the ideal beater where rust or corrosion would be detrimental.

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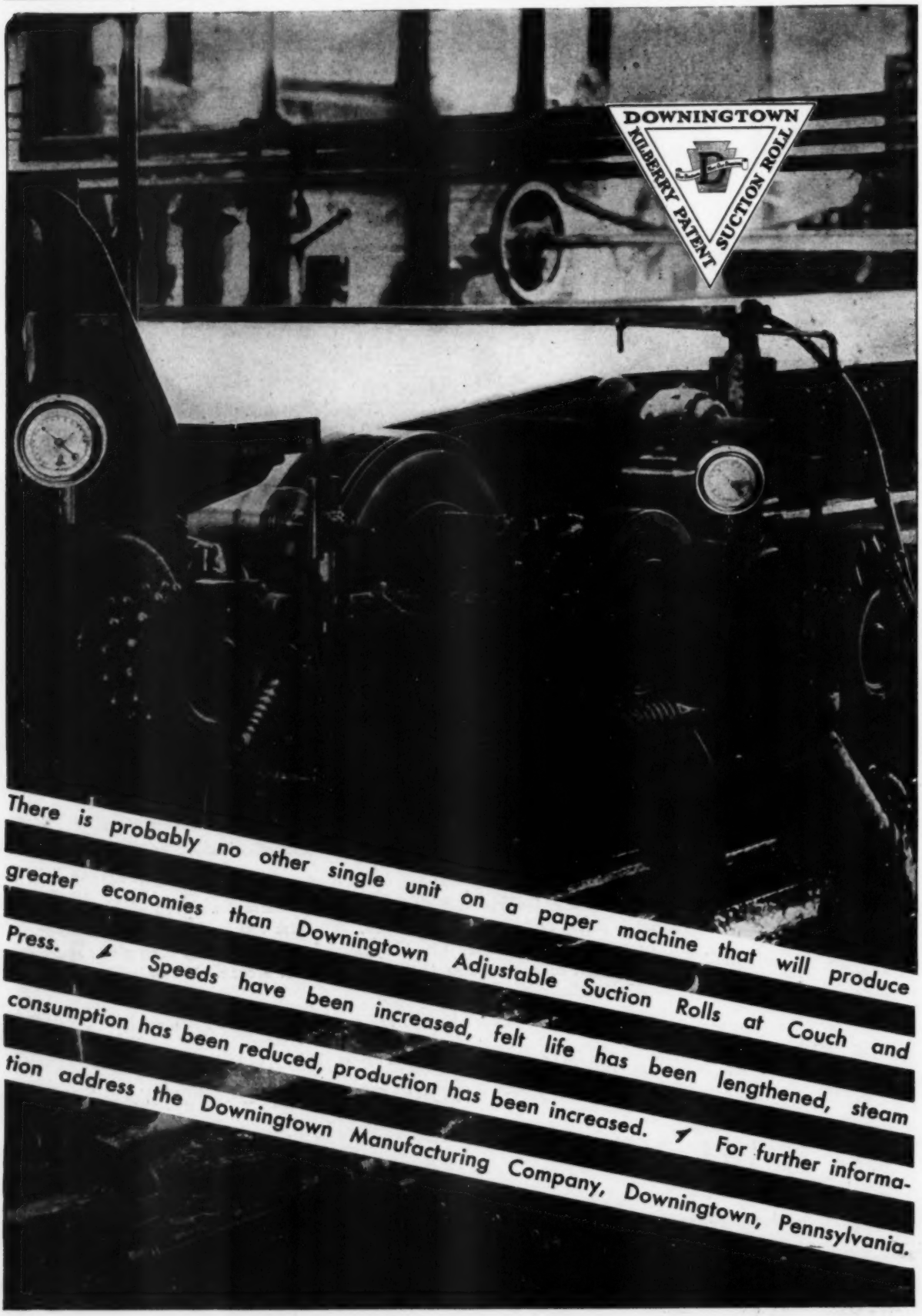

There is probably no other single unit on a paper machine that will produce greater economies than Downingtown Adjustable Suction Rolls at Couch and Press. Speeds have been increased, felt life has been lengthened, steam consumption has been reduced, production has been increased. For further information address the Downingtown Manufacturing Company, Downingtown, Pennsylvania.

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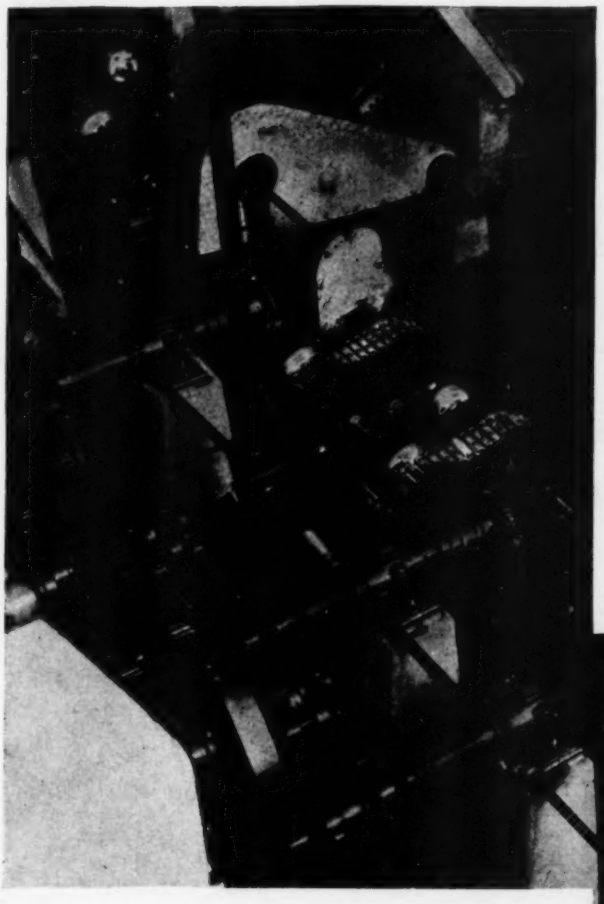
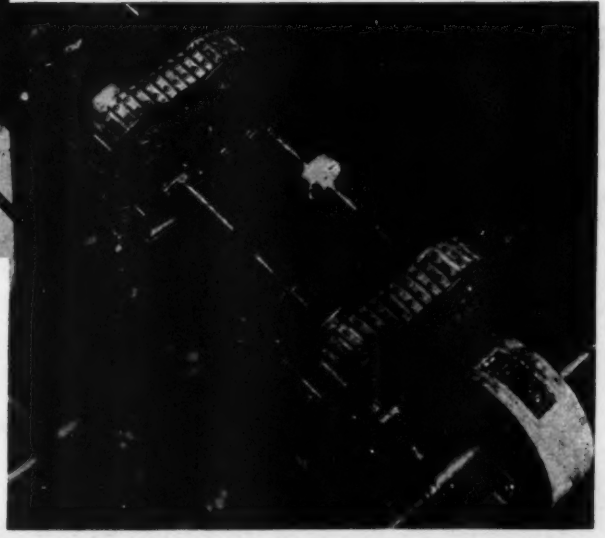
The *proved precision* of standard, stock REEVES Transmissions under such exacting requirements is unassailable evidence for industrial executives and engineers who seek the most dependable method for *accurate, positive, infinite,* machine-speed control.



• View in U. S. Forest Products Laboratory (U. S. Dept. of Agriculture)—Seven standard REEVES Transmissions each provide precise variations (often in fractions of 1%) in the relative speeds of this seven-section model paper machine. The infinitesimal but accurate variances in speed are necessary to compensate for stretch or shrinkage of paper in process. To match the speed requirements of various weights, grades and qualities of paper, the entire line of REEVES Transmissions can be set for a speed range offrom 12 to 100 feet per minute. (Illustration shows Transmissions with metal covers removed.)



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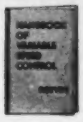

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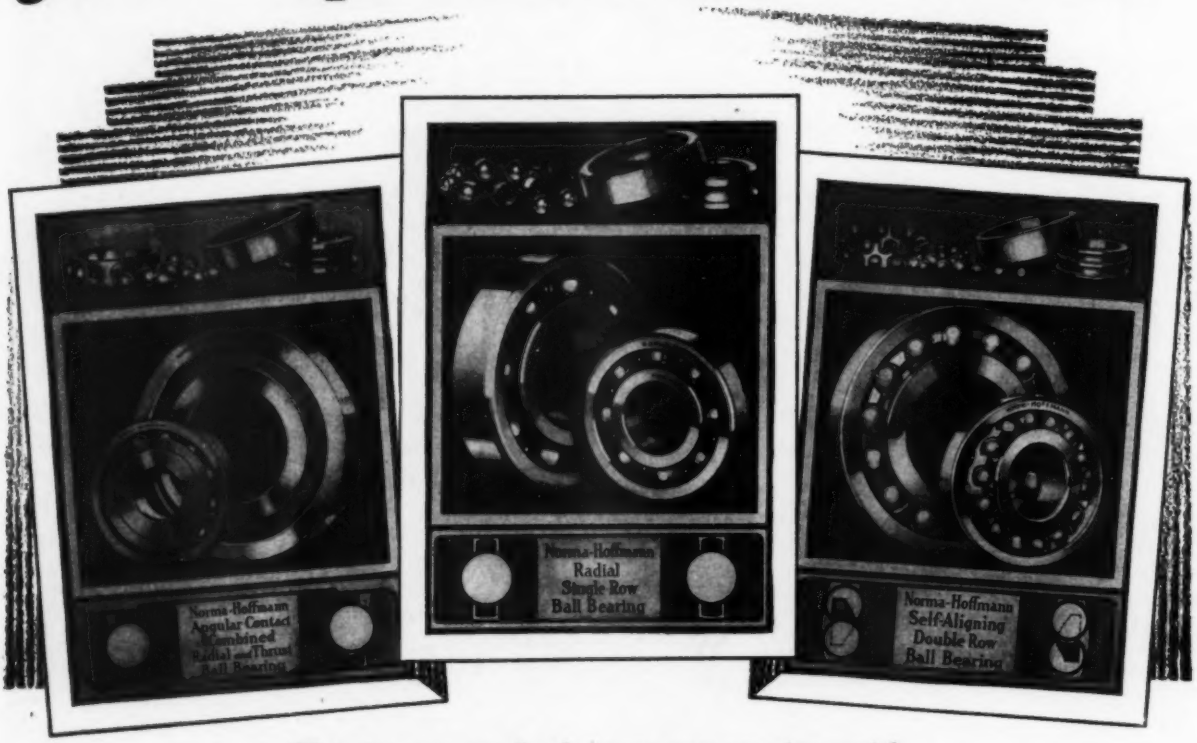

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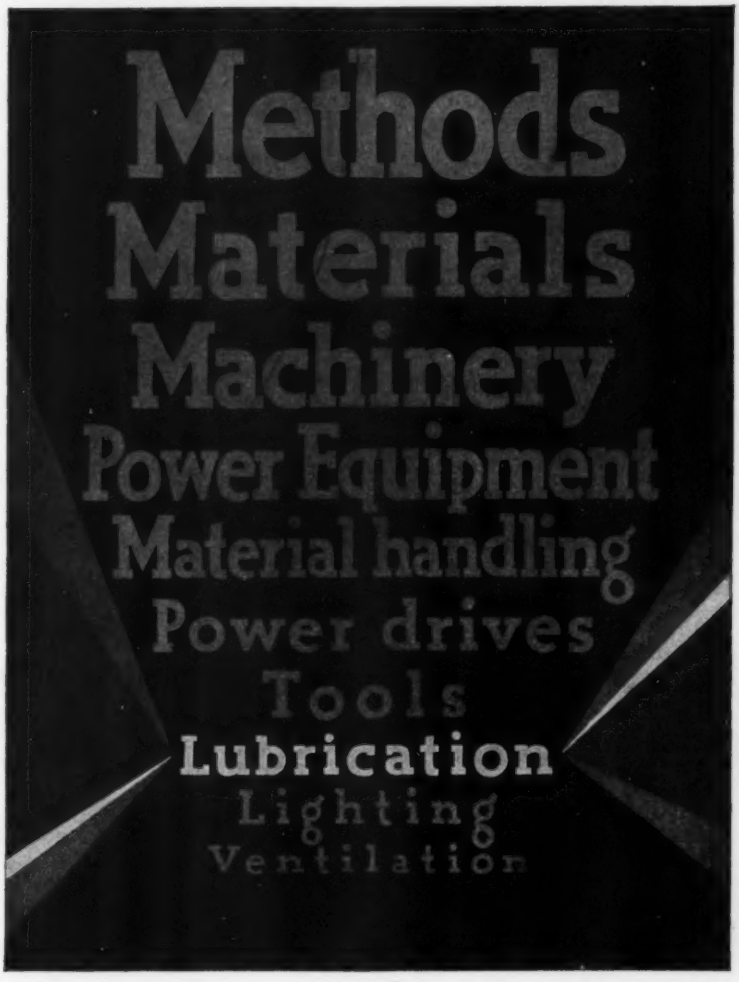

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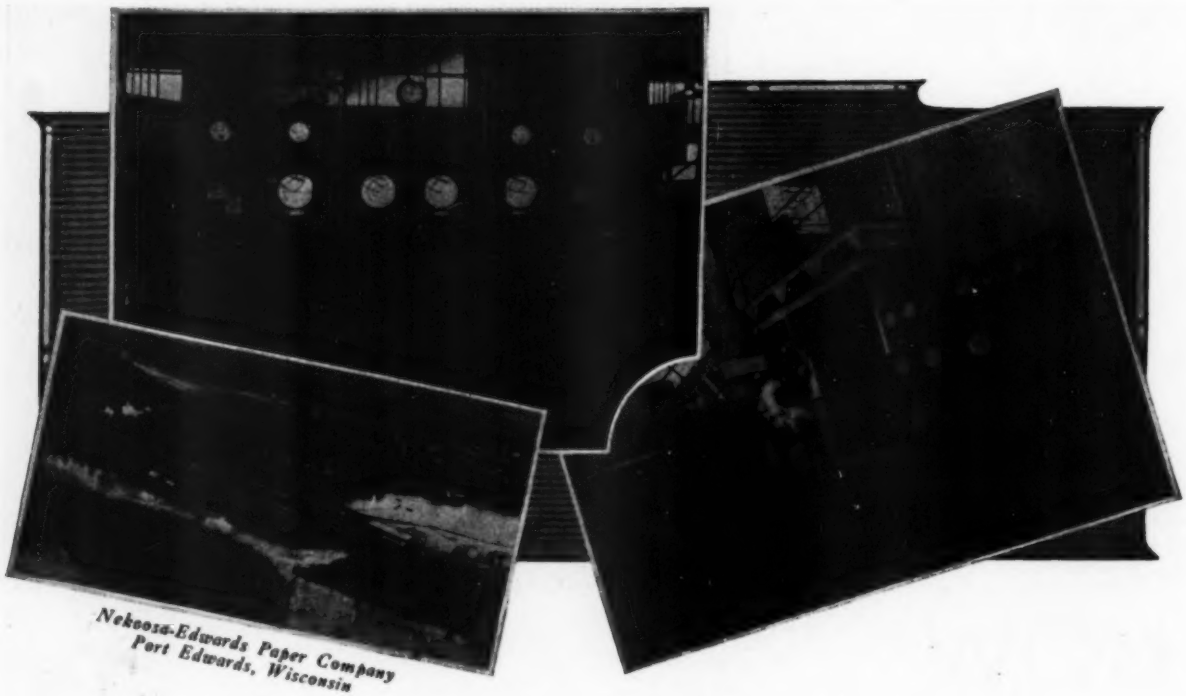

Nekoosa-Edwards Paper Company
Port Edwards, Wisconsin

WIDENING THE MARGIN OF PROFIT

In the race of competition Power must be generated with economy and used without waste. It is costly procedure for operators to grope in the dark—blindly guessing when to change fuel feeds or air supply, blow tubes, repair baffles and other operations.

Minimum power costs are obtained at Nekoosa-Edwards Paper Company, Port Edwards, Wisconsin, by use of Bailey Meters. In the boiler room Bailey Boiler Meters, Multi-Pointer Gages, Pressure Recorders and Temperature Recorders inform the operators of changing conditions. They tell when to make the readjustments necessary with fluctuations of load. Most important, however, they enable the operators to constantly maintain maximum combustion efficiency consistent with economical operation.

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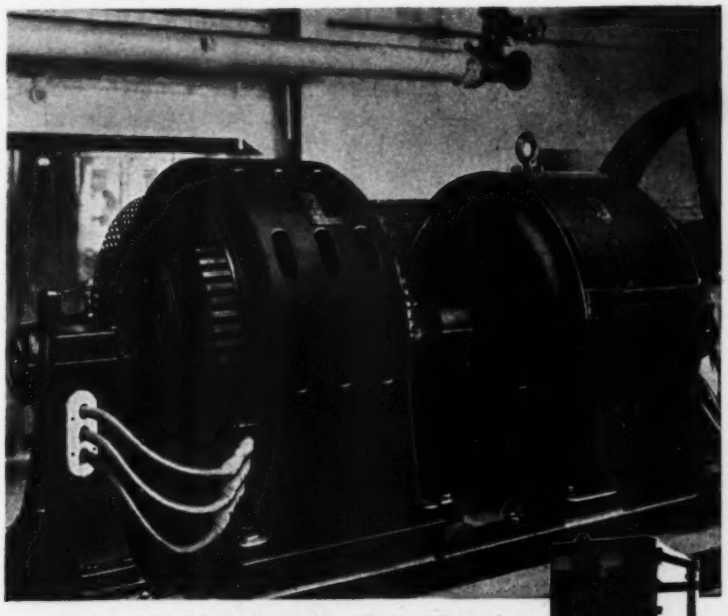
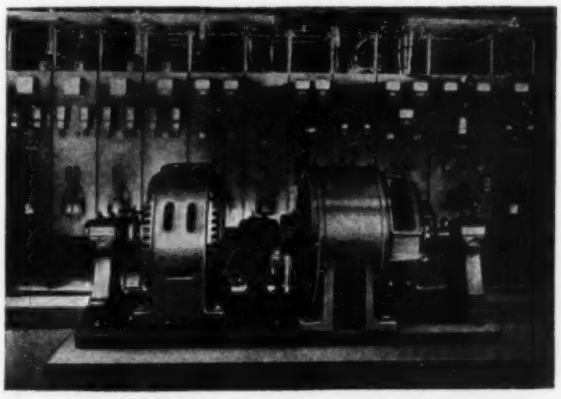
YOUR MOTOR GENERATOR SET MUST BE RELIABLE



A 250 KW. E-M Synchronous Motor Generator Set at the Covington, W. Va., plant of the West Virginia Pulp and Paper Company. This 3-bearing set consists of an E-M Synchronous Motor driving a 250 KW. direct current generator.

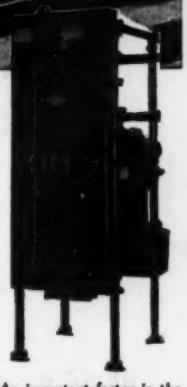
BEHIND E-M Synchronous-Motor Generator Sets is the advanced engineering of the E-M organization . . . engineering that comprises the most highly specialized experience of the synchronous motor-building field. That is why E-M Motor Generator Sets are absolutely reliable . . . why they have become the preferred source of direct current supply in so many paper mills.

E-M Synchronous Motors for driving generators are designed specially and individually for the work. They are liberally proportioned, both electrically and structurally. Ruggedness characterizes their every detail of construction. High electrical efficiency characterizes their operation.



75 KW. E-M Synchronous Motor Generator Set in the plant of Midwest Rubber Reclaiming Co. near St. Louis, Mo.

E-M Synchronous Motors for E-M Motor Generator Sets insure constant speed, unaffected by normal voltage variations. They have specially designed cage windings which keep down current inrush. The constant speed of E-M Motor Generator Sets insures good voltage regulation and easy paralleling with other generators. Plant power factor is improved through the use of these Synchronous Motor sets. Continuous operation through momentary voltage irregularities is provided in the E-M Synchronous Motor and Control. Hence production dependent on direct current is not interrupted.



An important factor in the smooth performance of E-M Motors is the E-M Automatic Starter. Synchronization is accomplished in the shortest possible time and with a minimum of current inrush and line disturbance. "Frequency-responsive" control, the essential element of the E-M Starter, provides speed-controlled, permanently correct and trouble-free starting.

E-M Synchronous Motors and E-M Synchronous Motor Generator Sets are described fully in *"The Most Efficient Drive in Industry"*, a 64-page illustrated book sent free on request. Write for a copy.

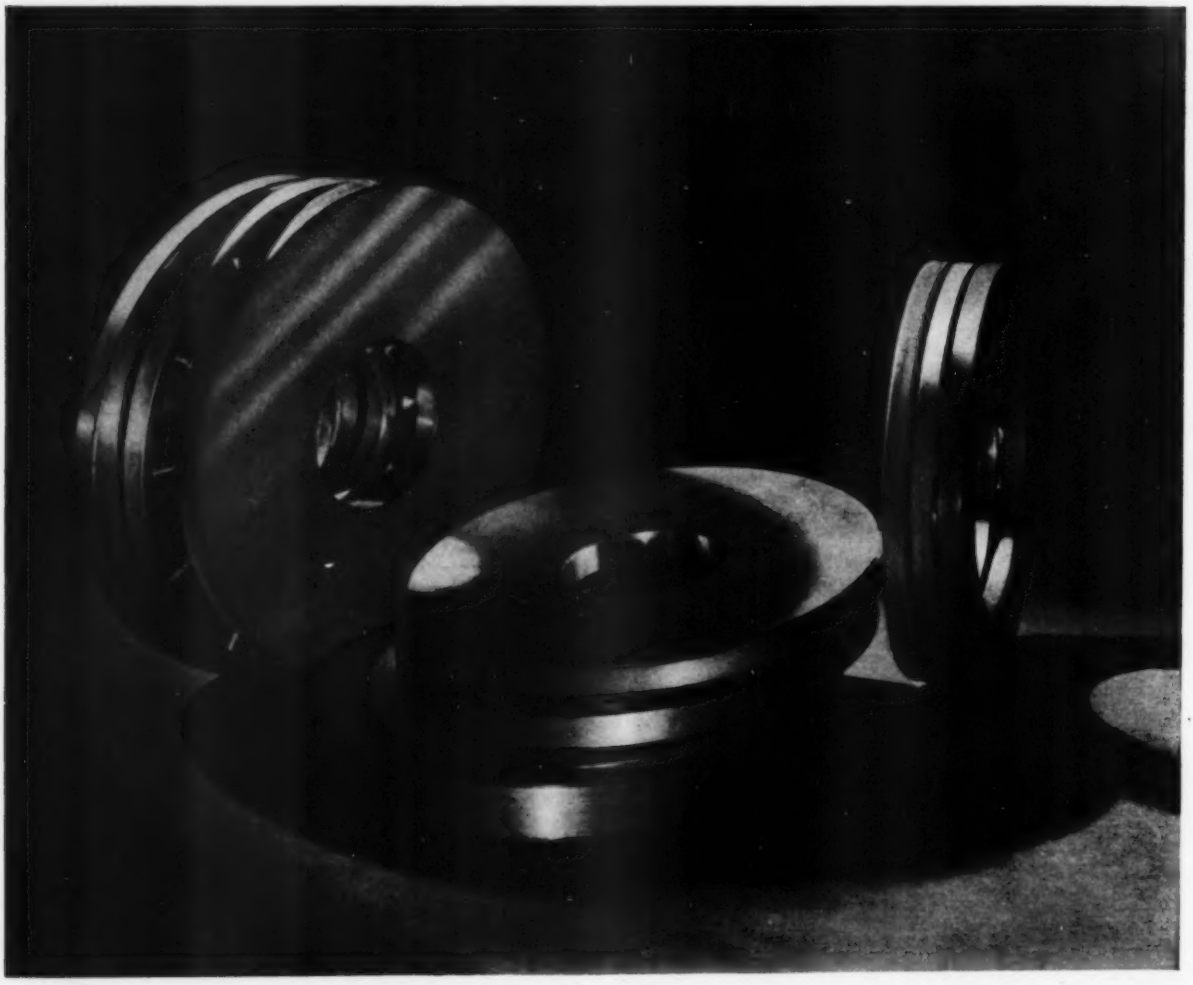
ELECTRIC MACHINERY MFG. COMPANY

Specialists in Apparatus for Power Factor Improvement

1341 Tyler St., N. E., Minneapolis, Minn.

Sales Offices in Principal Cities

EM *Synchronous* MOTOR GENERATOR SETS (A-00)



Manufacturers of Paper Making Equipment—who use Rollway Solid Cylindrical Roller Thrust Bearings know their value in those applications where such bearings have to stand up under the grind of day in and day out service.

They know and appreciate the fundamental axiom that loads vertical to the axes of the rollers have no force component tending to displace them and hence provide the maximum thrust capacity.

Rollway Thrust Bearings are made in types to suit all applications, and in sizes up to 30″ diameter, having capacities of over a million pounds. Rollers and plates are made of alloy steel, hardened throughout to a degree combining maximum strength with maximum resistance to wear.

Submit your problems to our engineers, and benefit by their background of more than twenty years' experience in applying roller bearings to the varied requirements of industry.

ROLLWAY BEARING
COMPANY INCORPORATED
SYRACUSE NEW YORK
ROLLWAY CYLINDRICAL ROLLER BEARINGS

MAKE AN ACTUAL TEST

Install DAYTON COG-BELT DRIVES AND CHECK RESULTS

By making an actual factory test of Dayton Cog-Belt Drives and checking results you'll find that Daytons will solve your power transmission problems. You'll find that Daytons are easier on bearings. Dayton Cog-Belts grip the pulley grooves firmly but without tension. They're die-cut for precision, and they do not squash or buckle. You'll find that Daytons will regularly show smoother—more accurate—speed control. They're built true, and they *stay* true. They're pre-stretched *permanently*. You'll find Daytons will turn out a more uniform product—stand up better against heavy loads—prevent stoppages for servicing and replacements—take up less floor space and use smaller pulleys.

There are many other sound reasons for the better performance of Dayton Cog-Belt Drives—reasons that we'll explain in full detail if you'll write, outlining your problems.

Look at the illustrations. Note the strong points of Dayton Cog-Belt construction. Then send for a Dayton Cog-Belt Catalog and for a sample section of the Cog-Belt itself. Write today.

THE DAYTON RUBBER MANUFACTURING CO.
DAYTON, OHIO

Factory Distributors in Principal Cities and All Westinghouse Electric & Manufacturing Company Sales Offices

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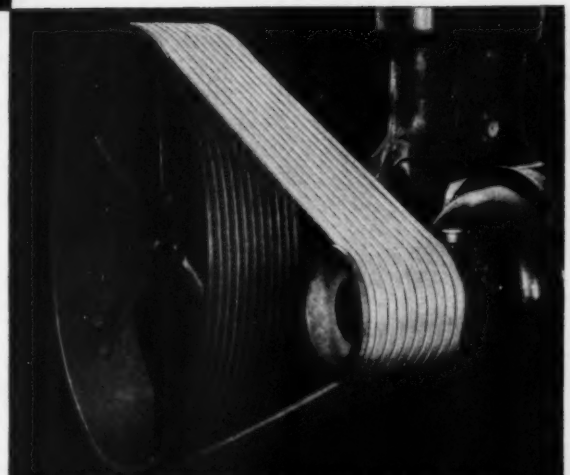


COMPLETE DRIVES—PULLEYS AND BELTS—IN STOCK. ALL RATIOS, 2 H. P. TO 100 H. P.

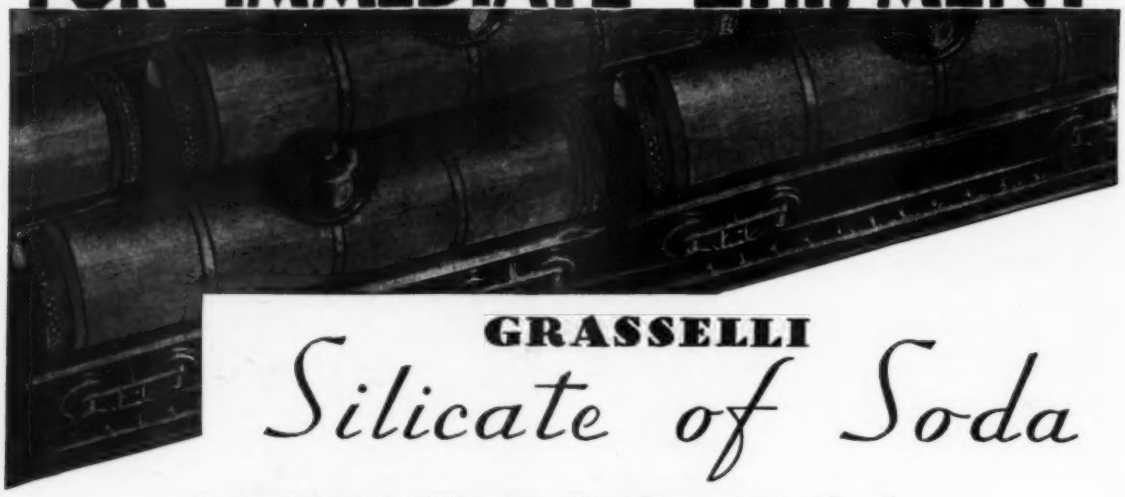
DAYTON COG-BELTS ARE "BUILT TO BEND"

Dayton COG-BELT DRIVES

OUTSTANDING ADVANTAGES OF DAYTON COG-BELT DRIVES

1. Minimum space required
2. Positive speed
3. Rugged—long lived
4. Smooth starting and running
5. Vibration eliminated
6. Less maintenance
7. Less adjustment
8. Quiet
9. Clean
10. Easy on bearings

FOR · IMMEDIATE · SHIPMENT



GRASSELLI
Silicate of Soda

A mineral loader used by many mills making various grades of paper. Its use increases retention of other fillers and sizes, improves formation and printing qualities of the paper and prevents "whiskers".

Other Grasselli Chemicals for Paper Manufacturers

Acetate of Lead	C. P. Ammonium Hydroxide
Aluminum Sulphate, Commercial	C. P. Hydrochloric Acid
Aluminum Sulphate, Iron Free	C. P. Nitric Acid
Aqua Ammonia	C. P. Sulphuric Acid
Barium Carbonate	Muriatic Acid
Barium Chloride	Salt Cake
Barium Sulphate (Blanc Fixe)	Soda Ash
Bleach	Sulphuric Acid
Caustic Soda	Tri-Sodium Phosphate

FOUNDED 1839 GRASSELLI REG. U.S. PAT. OFF.

Write, wire or phone any of our branches below. Our Research Department may be of help in solving some of your problems. This service is available to you.

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INCORPORATED CLEVELAND
New York Office and Export Office: 347 Madison Ave.
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Los Angeles—363 New High St. San Francisco—576 Mission St.
Represented in Canada by CANADIAN INDUSTRIES, LTD.
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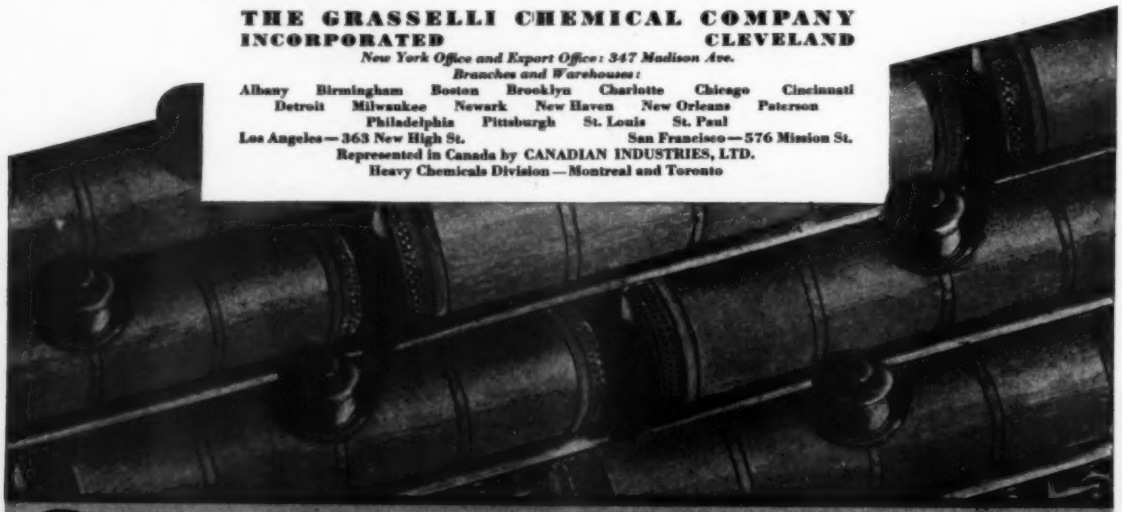

GRASSELLI GRADE
A Standard Held High for 92 Years

Tycos Instruments for Pulp and Paper Manufacture

Watching Beater Temperature Means Better Stock » » »

TEMPERATURE plays an important part in the reaction between the pulp and the various materials blended in the beater. There is a stock temperature suited for obtaining the best results with free size, neutral size, American clay, British clay, alum, starch, direct dyes, acid dyes or basic dyes.

Each mill has its own particular problem to handle. Local conditions as to water used and other variables must be considered. Temperature is not the only factor but an important one . . . one that should not be disregarded when the valuable contents of a beater are at stake. *Tycos* Recording Thermometers have shown that they can assist the beater engineer in producing uniformly sized and colored stock.

There are *Tycos* Recording Thermometers to fit the range of every beating operation, giving the operator a reliable record of stock temperature throughout the beating cycle and furnishing the mill superintendent with a complete picture of each day's work, showing temperatures maintained, length of beating cycles and time required for filling.

Taylor Instrument Companies

Rochester, N. Y., U. S. A.

IN CANADA
Taylor Instrument Companies OF CANADA, LTD.
TORONTO

IN GREAT BRITAIN
MANUFACTURING DISTRIBUTORS
SHORT & MASON, LTD.
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Tycos Recording Thermometer, shown on a beater in a Northern paper mill, where it gives the mill manager an accurate history of beating operation each day. The beater engineer can tell from the Tycos Chart when each beater was furnished and approximately when it should be dumped. We will send reproductions of charts from this instrument on request.

Send for a

Tycos Catalog

- Clip
- And Mail
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Taylor Instrument Companies
95 Ames Street
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Please send a copy of your Catalog Part 6 for the Pulp and Paper Industry to:

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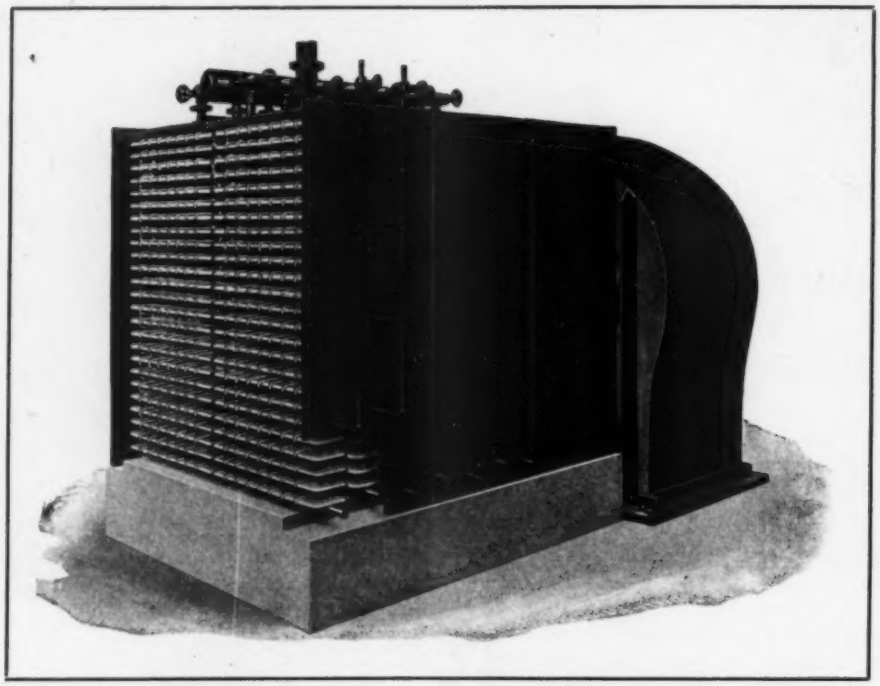


PRINCIPLES

The Stickle Vacuum Blast Coil Economizer is the first and only heater constructed with horizontally disposed flat elongated tubes, built up into a continuous return coil system with inlet and outlet arranged to prevent the sections from filling with water and leaving a liberating space over the surface of the water. Cold air coming in contact with the radiating surfaces condenses the steam within the economizer and creates a vacuum in which high temperature condensate boils freely at a temperature of 175° F. The steam from the condensate keeps the top of the economizer sections hot. The condensate that vaporizes takes its latent heat from the surrounding water, and there is a transfer of heat from the condensate to the air passing through the free area between the coils. Cooling water is eliminated.

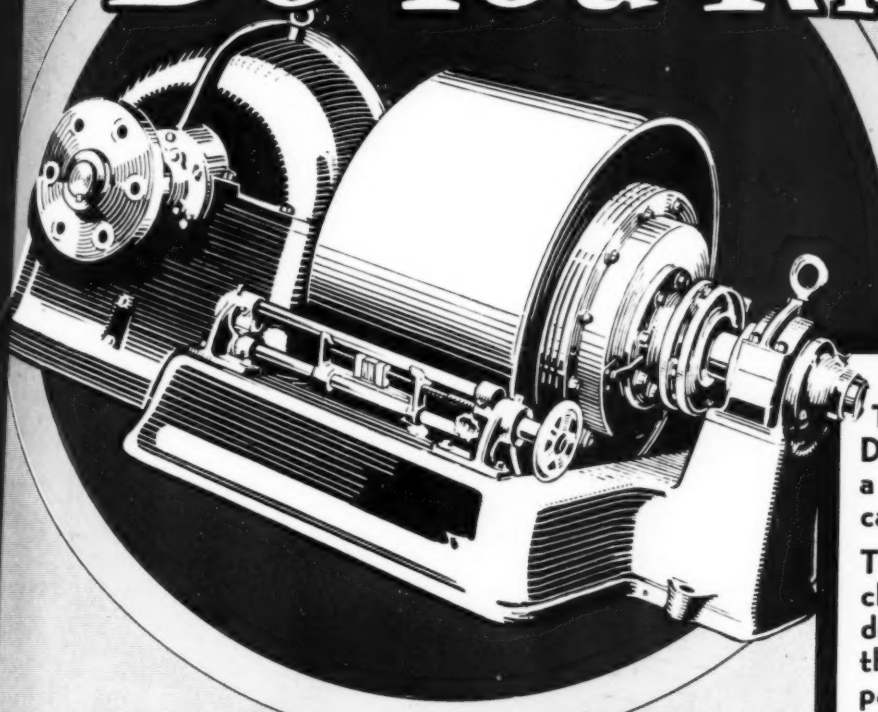
Install a Stickle Vacuum Blast Coil Heater on the return line of your paper machine and make a direct saving of at least 15% in steam consumed for drying paper and for conditioning the air for heating and ventilating the machine room.

Stickle Steam Specialties Co.

INDIANAPOLIS, IND.

AUTOMATIC STEAM CONTROLS » » » » COMPLETE LINE STEAM SPECIALTIES
BLOWING THROUGH DRAINAGE SYSTEMS

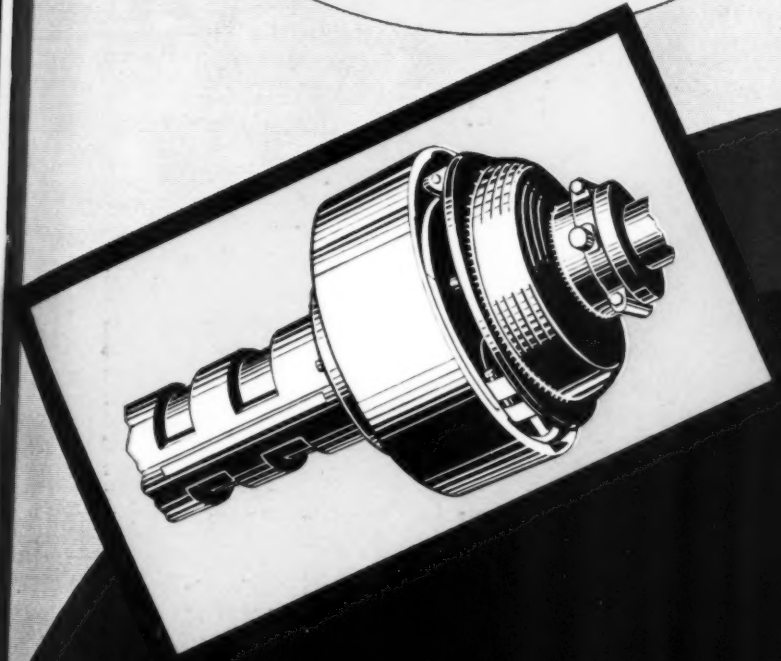
Do You Know!



The B-C Spiral Bevel Gear Drive is built with either a magnetic or a mechanical clutch.

The new B-C multiple disc clutch shown below was designed especially for this Spiral Drive. It is compact, accurately balanced, and has a generous friction area for high power. Also sold separately for any purpose requiring a good clutch. Write for Circ. No. 246 for details of various sizes.

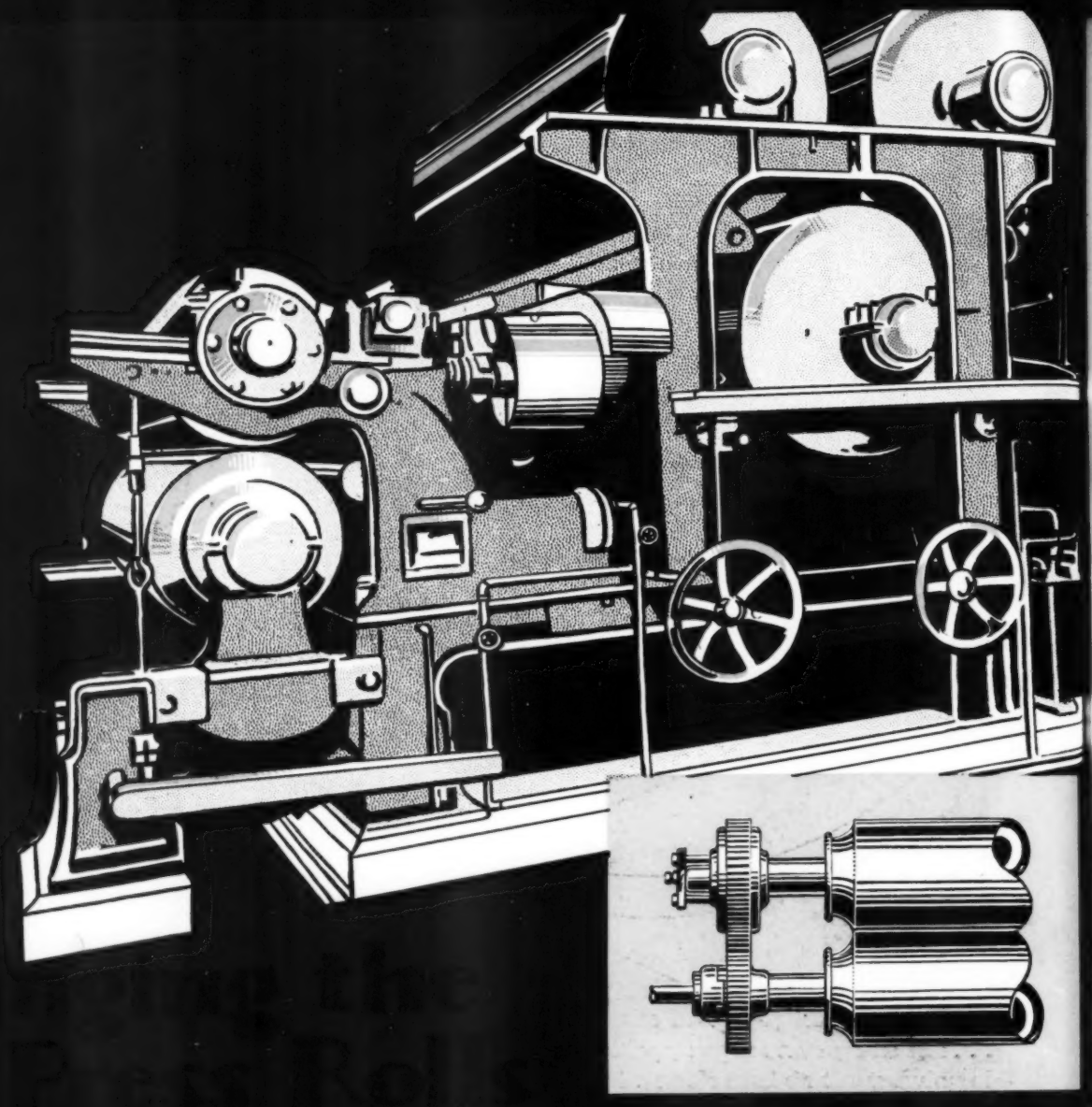
If your drives are giving trouble, replace them with Spirals. They are not expensive and can in most cases be installed in the space of your old drives.



Write for Messenger No. 52

The **BLACK-CLAWSON** Co.

Hamilton, Ohio



Twenty-four hours a day your top press roll is slipping—out of step with the travel of your bottom rolls. Yesterday you had to "stand for" that. There was no way to prevent it. Today a corrective is available.

Stop a moment. Think what that slippage is costing you—far more than you, perhaps, think.

The Shartle compensating gear drive corrects that trouble—drives the top press rolls at the correct speed.

Although on the market only a few months, quite a number of mills are already using this new drive—and getting results.

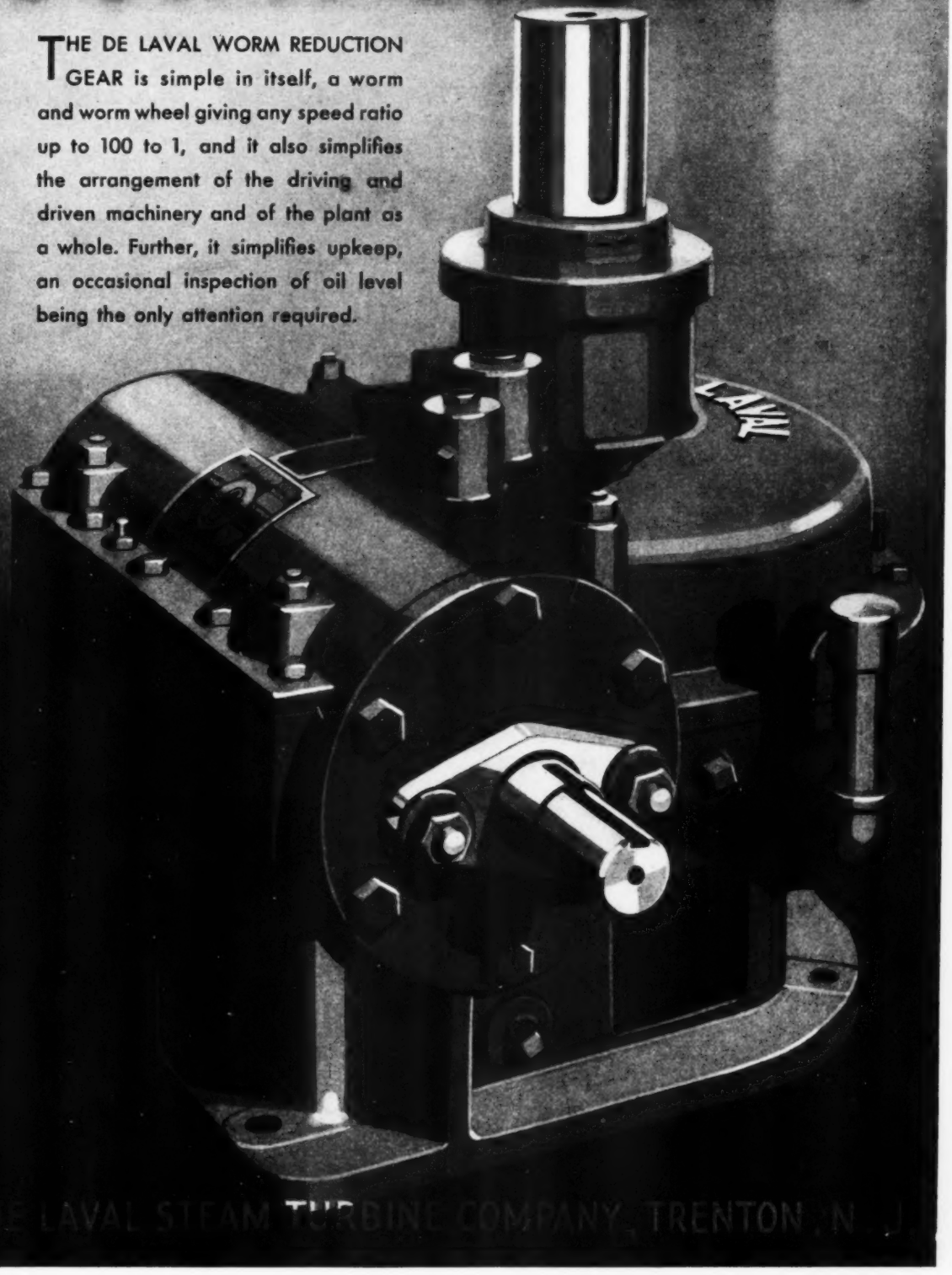
Have us send you detailed information—and at once. They're not expensive.

Shartle Brothers Machine Co.
MIDDLETOWN, OHIO
Owned by THE BLACK-CLAWSON CO.
HAMILTON, OHIO
Export Office, 15 Park Row, New York, N. Y.

SHARTLE COMPENSATING GEAR DRIVE

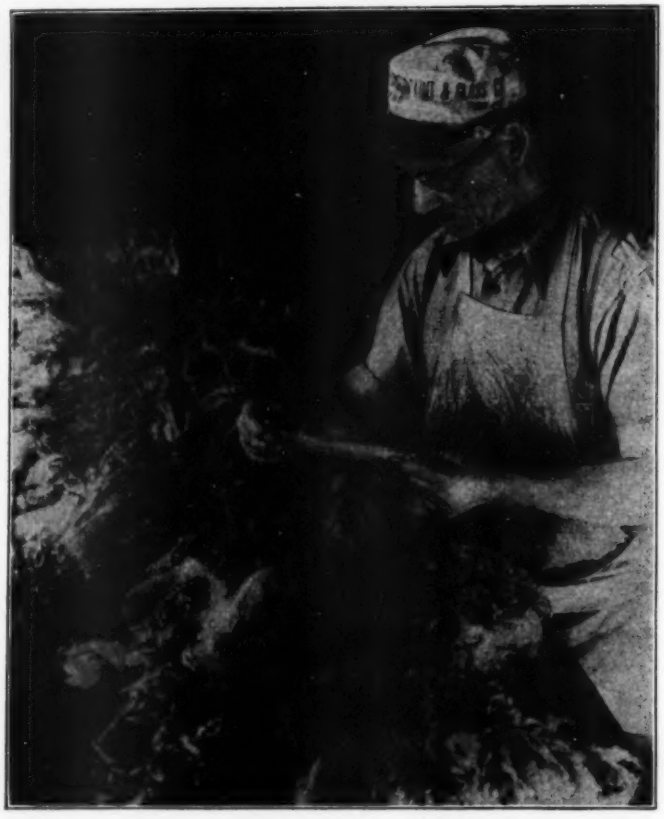
SIMPLICITY

THE DE LAVAL WORM REDUCTION GEAR is simple in itself, a worm and worm wheel giving any speed ratio up to 100 to 1, and it also simplifies the arrangement of the driving and driven machinery and of the plant as a whole. Further, it simplifies upkeep, an occasional inspection of oil level being the only attention required.



DE LAVAL STEAM TURBINE COMPANY, TRENTON, N. J.

HOW VALUE IS ASSURED IN EVERY HAMILTON FELT



Careful grading assures the proper kind of fibre for every type of felt

JUST as there is a difference in the wools which come from the various parts of the world, so also is there a difference in the wool which comes from the various parts of the fleece.

Consequently, in the Shuler & Benninghofen Mills every raw fleece is carefully graded by hand for the choice wools from the shoulders and back, the heavier fibres from the loin, the long coarse staples from the flank. As many as twelve different sortings can be made from the same fleece . . . each a different grade of wool with different characteristics.

This is necessary because every Hamilton Felt is made from those wools which are best for the purpose according to the grade of paper or board to be produced.

For instance, the better grades of paper, fine books and writings, require a very fine felt . . . a plate felt. The wools used on the weaving of such a felt are also of the finest staple, which, in turn are spun into finer yarns. Board felts require coarser fibres. And there are many variations in between.

Because these things are thought of, right where the wool is graded, a Hamilton Felt is a better felt . . . it makes a better sheet of paper. You'll discover this to your own satisfaction the first time you try one.

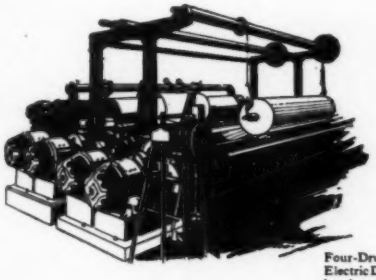
SHULER & BENNINGHOFEN, Hamilton, Ohio

Miami Woolen Mills Established 1858

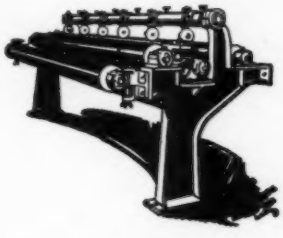
Hamilton Felts

Hamilton Felts are marked by two blue lines full width of the felt and by one shorter blue line midway between them.

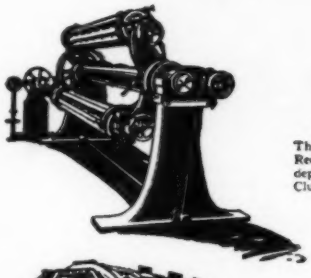
PAPER MAKING MACHINERY



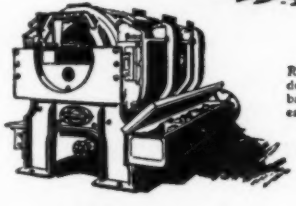
Four-Drum Winder with Electric Drive. Controls roll hardness automatically.



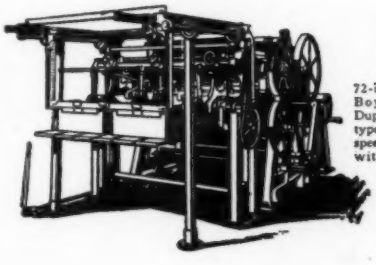
Ball Bearing Slitter Part. Quick-removable top and bottom blades give greater production with less waste.



Three-Drum Revolving Reel. Each drum has independent M & W Friction Clutch drive.



Rotary Screen, with divided diaphragms giving balanced movement and easy flow.



72-inch single Lay Boy and Cutter. Duplex and Diagonal types also made. High speeds may be used with wide cutters.

Fourdrinier Paper Machines
Quick changing wire features

Cylinder Paper Machines
for all grades of board

Bevel Gear Drive Stands
with Ball Bearings and M & W High Speed Friction Clutch

Brass Collapsible Winder Shafts
Non-sticking; quick-changing

"Criss Cross" Shower Pipes
High efficiency with low water consumption

Disc Washers, new type

Drum Winders
Two-Drum type for small rolls
Four-Drum type: electric or belt drive
Two-Drum and Four-Drum Supercalender Winders

High Density Bleaching Process
Wolf, Bellmer, Fletcher

Hoffman Couch Rolls
Superior to rubber rolls

Pumps: Stuff; Suction; Centrifugal

Reels
With 2, 3, 5 or 6 drums; Upright and Revolving types

Rotary Screens
Clean paper with minimum maintenance

Save-Alls
Economical, efficient closed system

Single and Duplex Cutters
High speeds—all widths—all kinds of paper

Single and Duplex Lay Boys
Increase cutter output; reduce finishing room costs

Slitter Parts
New ball bearing type, with removable Slitters, saves slitter tears

Wire and Felt Guides
Ball and plain bearing types for all speeds

Wood Suction Box Covers
Save wear of the Fourdrinier wires

M & W Friction Clutches and Speed Changes

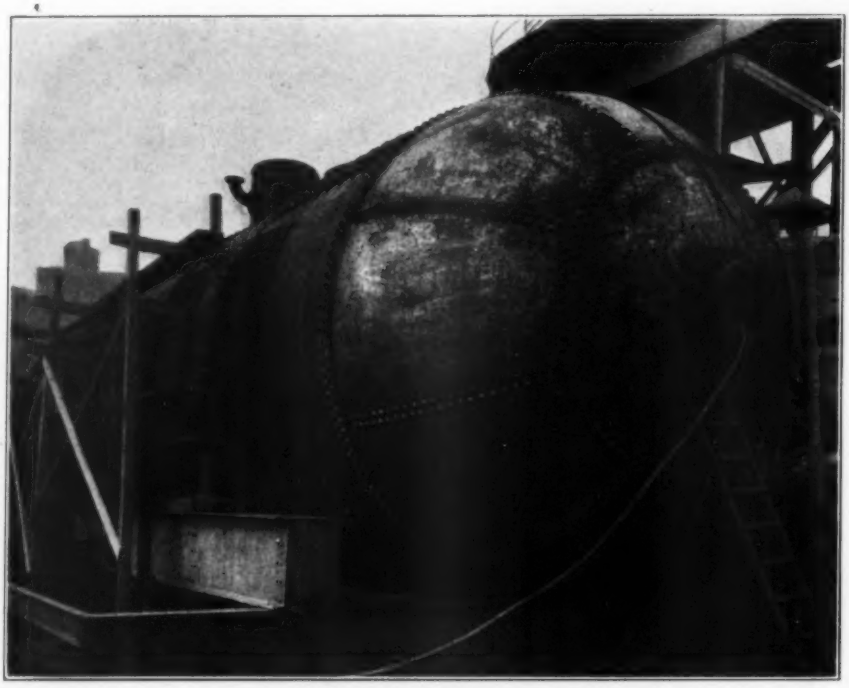
Information and Bulletins on request

THE MOORE & WHITE COMPANY

Established 1885

PAPER MACHINE BUILDERS

15TH ST. & LEHIGH AVE., PHILADELPHIA, PA.



Steam Accumulator 16' dia. x 65' lg.
150# Working Pressure built of 1-17/32" plate.

For more than a quarter of a century we have been designing and building paper mill equipment. In all these years many installations have been made in mills in the United States and Canada. Repeat orders indelibly indicate the kind of service Manitowoc equipment is giving.

It will pay you, when in the market, to consult us—to let our engineers co-operate with you. An inquiry does not obligate you.

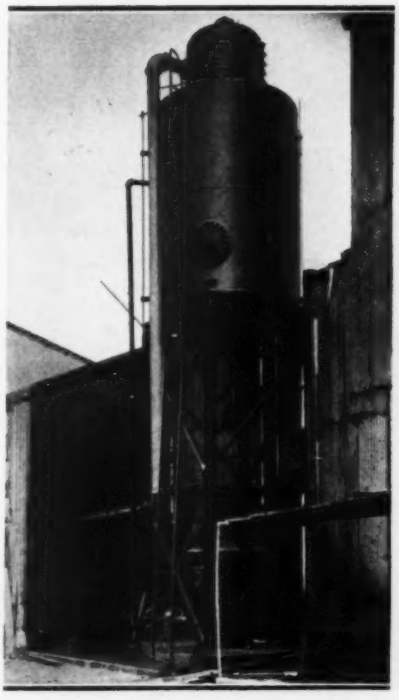
We design and build barking drums, sulphite digesters, experimental digesters, globe rotary digesters, cylindrical digesters, rotary lime kilns, incinerators, disc evaporators, air nozzles, diffuser tanks and swing pipes, bleach and clay mixers, rod mills, Moore speedcranes, shovels, draglines and trenchoes.

MANITOWOC ENGINEERING WORKS

Manitowoc, Wisconsin

JACK UP THE PROFIT CURVE

YOU CAN DO IT WITH GRAVER WATER SOFTENERS



" EVERY penny that's spent in useless maintenance of boilers, feed water equipment, piping and process units is potential profit gone wrong. Every penny that's saved is doubly valuable.

Graver Water Treating Equipment may be your most profitable source of increased profits through *operating savings*. Certainly, the records of economies that others have effected is the strongest incentive to investigate. Our engineers can figure your approximate savings over present methods. There's no obligation, of course, in asking for an estimate of costs and savings.

Graver Tank & Mfg. Corp. is the largest designer and manufacturer of a complete line of water treating equipment.

GRAVER TANK & MFG. CORP., East Chicago, Indiana

Chicago New York Cleveland Ft. Worth Tulsa

Representatives in other principal cities

GRAVER
WATER TREATING EQUIPMENT

NEW!! NEW!!

HERMANN SELF-LOCK ASSEMBLED SHELL FILLING

Contracted *Side View* *Expanded*

At Last—An assembled shell filling that anticipates present day requirements, is unique in construction, and surprising in its quick and positive action.

A hinged bronze unit supplants the time-taking and troublesome wooden wedge and the anchor bar. In its contracted state, the filling is easily and quickly positioned. When in place, bolts are inserted, then tightened and the filling is automatically expanded and securely locked to the Jordan shell.

Eight Distinct Advantages

1. Less cost to install and remove.
2. Positive adjustment, eliminating wedge cutting and fitting.
3. Knives and woods tightened in Jordan shell independent of retaining rings.
4. Bronze unit can be returned for credit.
5. Greater number of knives.
6. Less grinding in.
7. No wedges at low points to serve as catch-alls.
8. Easily and quickly removed for chipping and just as easily and quickly returned to former position.

Furnished for all makes of Jordans and sold under a positive guarantee to give maximum and trouble-free service

CANADA
Waterous Ltd.
Brantford, Ontario

PACIFIC COAST
A. H. Cox & Co., Inc.
Seattle, Washington

THE HERMANN MANUFACTURING CO.
LANCASTER, OHIO

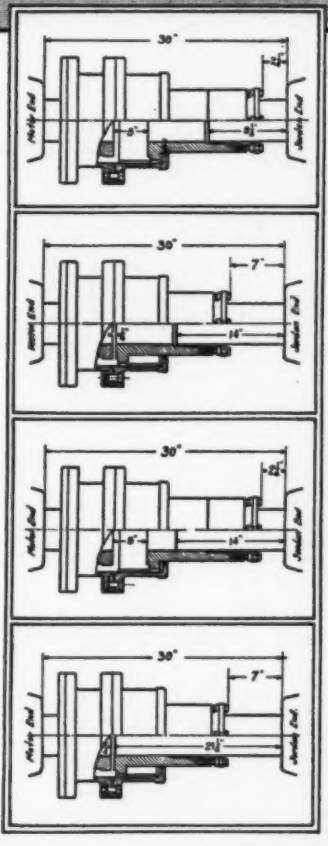
The How and Why of FAST'S Jordan Coupling

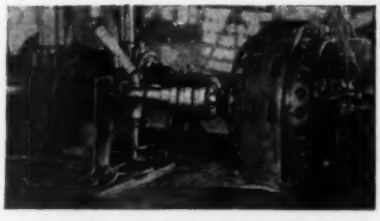
BY use of Fast's principle of Mechanical Flexibility, not only are shutdowns for coupling repairs eliminated, but adjusting the Jordan plug is simple, providing a full 12-inch adjustment.

To start with, it has no flexible lacings, bushings, springs or other flexible materials. Instead a new mechanical principle is used which eliminates the necessity for ever shutting down for coupling repairs.

Note the drawings of a Fast's Coupling on a 5-inch Jordan shaft. Diagram 1 shows the position when the Jordan lining is new, ready for a 4¾-inch adjustment of the plug, to position shown in diagram 2.

Now, by simply releasing four draw bolts the entire Jordan end of the coupling is set up toward the Jordan, and you are ready for another 4¾-inch travel, diagram 3. Then again this can be done, until the Jordan plug has been adjusted through full 12 inches, see diagram 4.





Fast's Telescopic Coupling connecting Motor and Jordan engine at Westfield River Paper Co., Inc., Russell, Mass.

Fast's Telescopic Coupling connecting Motor and Jordan engine at Thilmany Pulp & Paper Co., Kaukauna, Wis.

Fast's Telescopic Coupling connecting Motor and Jordan engine at Champion Coated Paper Company, Hamilton, Ohio.

FAST'S *Self-Aligning* COUPLINGS

NO FLEXIBLE MATERIALS

MAIL THE COUPON FOR FREE PAMPHLET

Do not fail to send for the free pamphlet, "Solving Coupling Problems in Paper Mills". It explains this jordan coupling in full, as well as other Fast's Couplings for every coupling problem of the pulp and paper industry.

THE BARTLETT HAYWARD CO.
213 Scott Street » « Baltimore, Md.

Please send me the free pamphlet on "Solving Coupling Problems in Paper Mills".

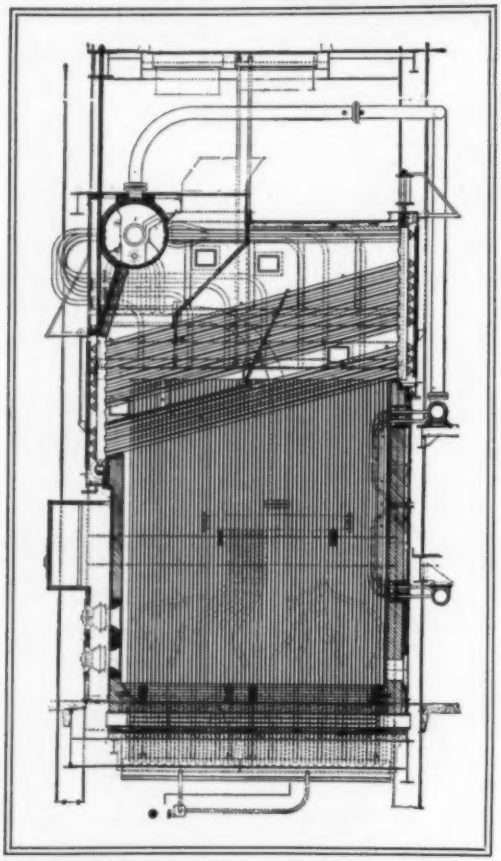
Name.....

Name of Mill.....

Address.....

SPRINGFIELD BOILERS & WATER WALLS

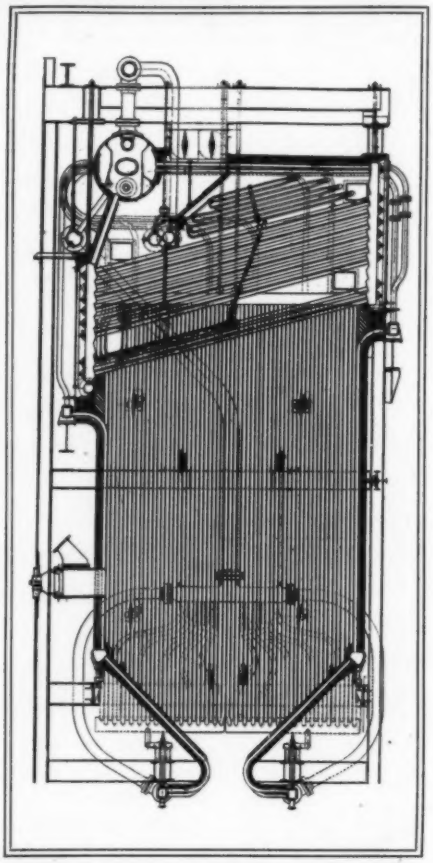
SECTIONAL —— ALL STEEL



One of THREE UNITS designed to generate 180,000 lbs. of steam per hour each at 450 lbs. pressure at the Belle Isle, Oklahoma City, plant of the Oklahoma Gas & Electric Co., Byllesby Engineering & Management Corp'n, Chicago, Engineers.

SPRINGFIELD BOILERS

ALL SIZES
ALL
PRESSURES



One of THREE UNITS designed to generate 140,000 lbs. of steam per hour each at 500 lbs. pressure at the Anheuser-Busch, Inc., plant, St. Louis, Mo. Ophuls & Hill, Inc., New York City, Engineers.

Complete Springfield Units are being selected by many prominent engineers for leading utility and industrial power plants. There's a reason. Our catalog tells the story. Your copy for the asking.

REPEAT ORDERS CONSTITUTE THE LARGEST PART OF OUR BUSINESS

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IN THE PULP AND PAPER INDUSTRY

70% repeat orders in 7 years tell more about the performance of Warren Pumps than 70 pages of text . . . .

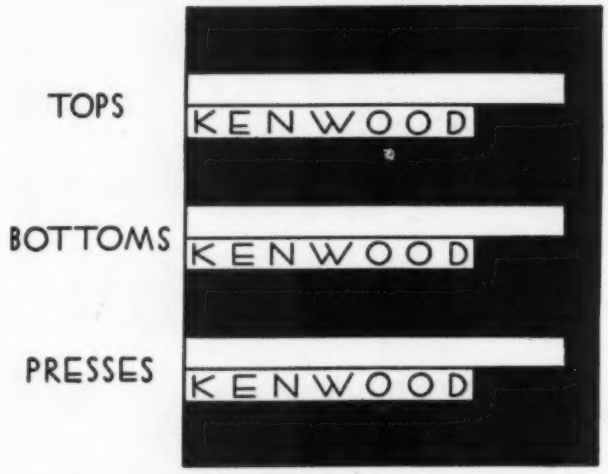
Designed by engineers thoroughly familiar with pulp and paper mill conditions, each installation is considered a distinctly separate job and recommendations are made on the basis of the right pump for each service. Get in touch with Warren—put your pumps on a par with your production machinery.

WARREN STEAM PUMP CO., Inc.
WARREN - - - - MASSACHUSETTS

AGENCIES IN ALL PRINCIPAL CITIES

4693

LOW COST -- RESULTS DEMONSTRATE THAT THERE ARE DISTINCT ECONOMIES IN KENWOOD TANNED BOARD FELTS



The new Kenwood Tanned Board Felts (Tops, Bottoms and Presses) used in conjunction with each other provide a combination with demonstrable economies. In addition to Lower Felt Cost Per Ton, this clothing shows other performance advantages through greater strength, increased openness, smoother running and longer life.

KENWOOD WOOL PRODUCTS

Today's Improved Kenwood Tanned Felts (wets and presses) are the result of progressive, scientific development. Kenwood pioneered the one-sided board felt. The same research service developed and perfected the Kenwood Tanning processes which protect the felt from the deteriorating effects of acids in the water. A third major development is the new Kenwood method of yarn construction which, while adding neither to the weight nor the size of the yarn, provides increased openness and strength for the felt.

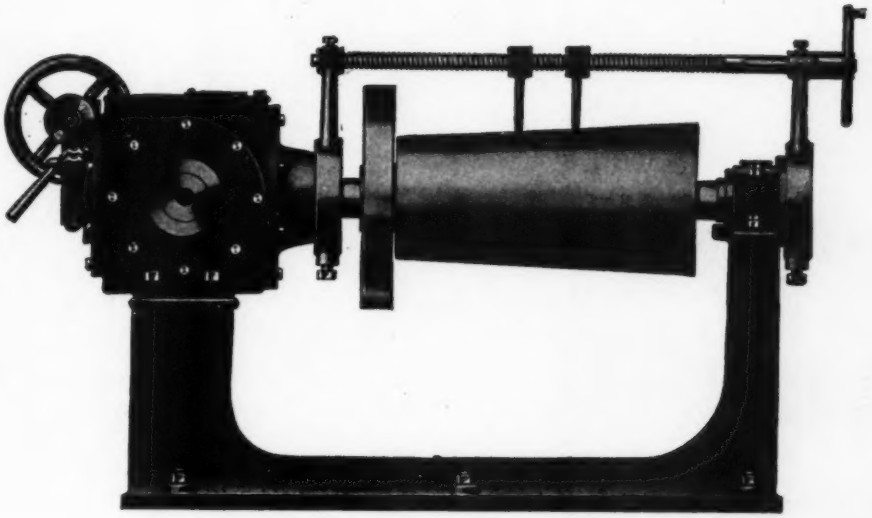
F. C. HUYCK & SONS

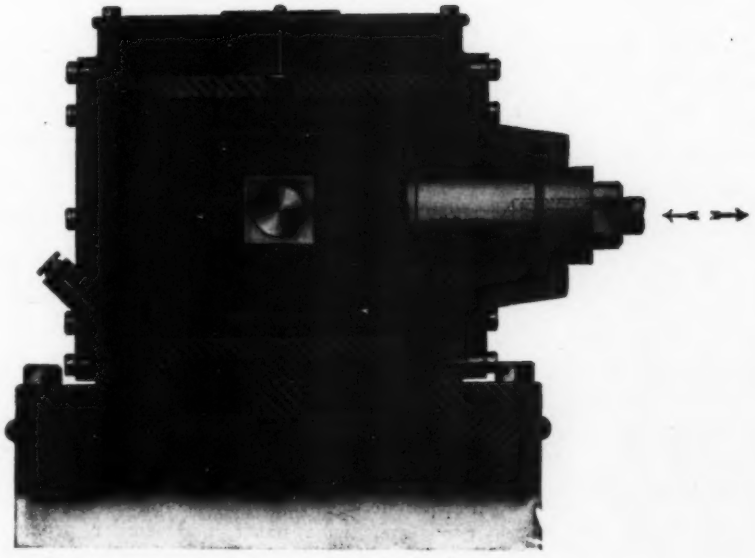
KENWOOD MILLS, ALBANY, N. Y.

KENWOOD MILLS LTD., ARNPRIOR, ONTARIO, CANADA

KENWOOD FELTS

THE BERTRAMS SHAKE





Stroke adjustable from nil to maximum while running.

Perfectly horizontal motion.

Working parts totally enclosed in oil.

Large wearing surfaces.

Extreme simplicity.

Eliminates clutches and loose pulleys.

Effect of shake on formation can be studied.

Can be furnished with base for motor or pulley drive.

In many cases it can be installed on present shake base.

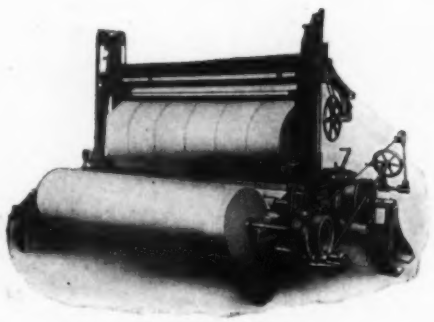
Manufactured by

THE BEVIS MACHINE COMPANY

Middletown, Ohio

TRUE, IT'S HARD TO BEAT OUR HEAVY DUTY MILL TYPE WINDERS

but remember we also make efficient rewinders for finishing room service



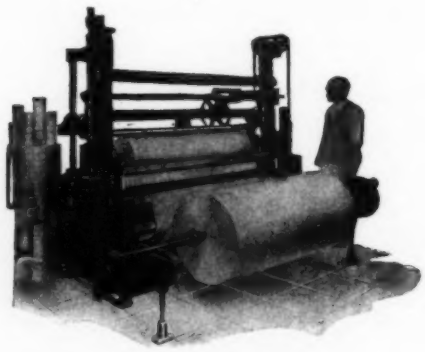
Camachine 10-7

Left

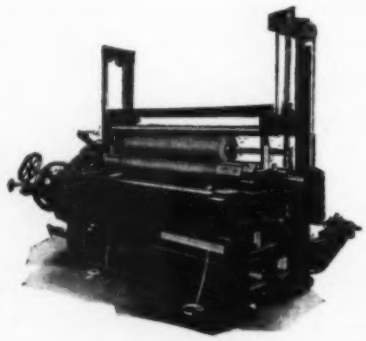
CAMACHINE 10, Model 7 is designed for the production of large diameter rolls of narrow strip. This machine produces hard rolls, easily separated, of such products as highly calendered and embossed paper, waxed paper, tire wrapping, and gummed papers, at speeds from 500 to 800 feet per minute. On the standard machine, the maximum diameter of rewound rolls is 27″, but a 36″ rewind can be furnished at extra cost. The machine is built in widths from 42″ to 82″.

Right

CAMACHINE 10, Model 5 is considered standard equipment for the production of small rolls of standard and specialty papers such as adding machine, cash register, stock ticker, player piano, blasting, barber headrest, and tire wrap rolls. It will accommodate webs in four sizes, 32″, 42″, 50″, and 62″ wide, rewinding to a maximum diameter of 24″ at speeds from 350 to 450 feet per minute.



Camachine 10-5



Camachine 9-5

Left

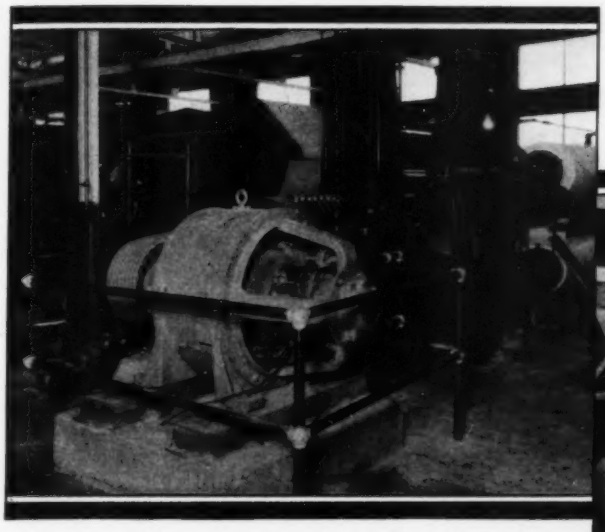
CAMACHINE 9, Model 5 is particularly adapted to the production of narrow rolls in diameters not exceeding 24″, at speeds ranging from 500 to 600 feet per minute. Rolls of coin wrappers, ticker tape, paper stays, twine paper, and similar products are rapidly and efficiently made on this machine. The machine is built to accommodate webs 32″, 42″, 52″, and 62″ in width.

CAMERON MACHINE COMPANY

61 Poplar Street **Brooklyn, New York**

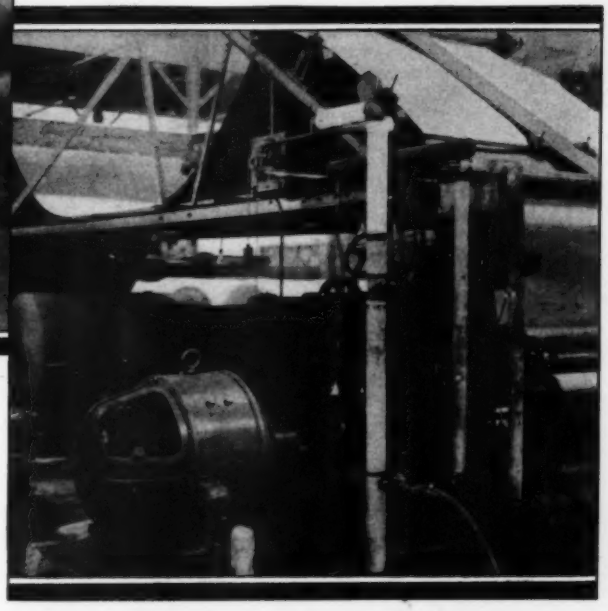
RELIANCE MOTOR-DRIVES

for Fragile Tissue *and* Heavy Board



(Above) Fourdrinier making 9-pound tissue driven by Reliance 100 h.p., 350-900 r.p.m. Motor.

The speed of this motor must remain constant regardless of load or speed at which it is set as variations of speed would cause changes in weight of paper.



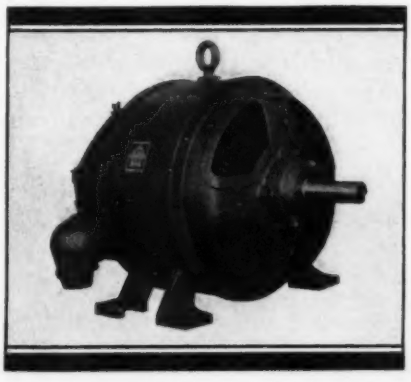
(Right) Langston Corrugating Machine driven by Reliance Motors in range. Makes corrugated board at 250 to 300 feet per minute. This photograph shows the corrugating section. Eight motors used for this drive.

Help Make A Better Product At Lower Cost

For driving machines making delicate tissue—news-print—heavy corrugated board—and all kinds and grades of stock—Reliance Motor-drives play a big part in turning out better products at lower cost.

Minute speed adjustments over wide ranges—simple control easy to operate—few working parts and low maintenance—continuous operation—have earned for Reliance the reputation as builders of good paper-mill drives.

Reliance engineers have had a great amount of experience in designing and applying motorized drives for paper-mill service. Their services are available to you without obligation.

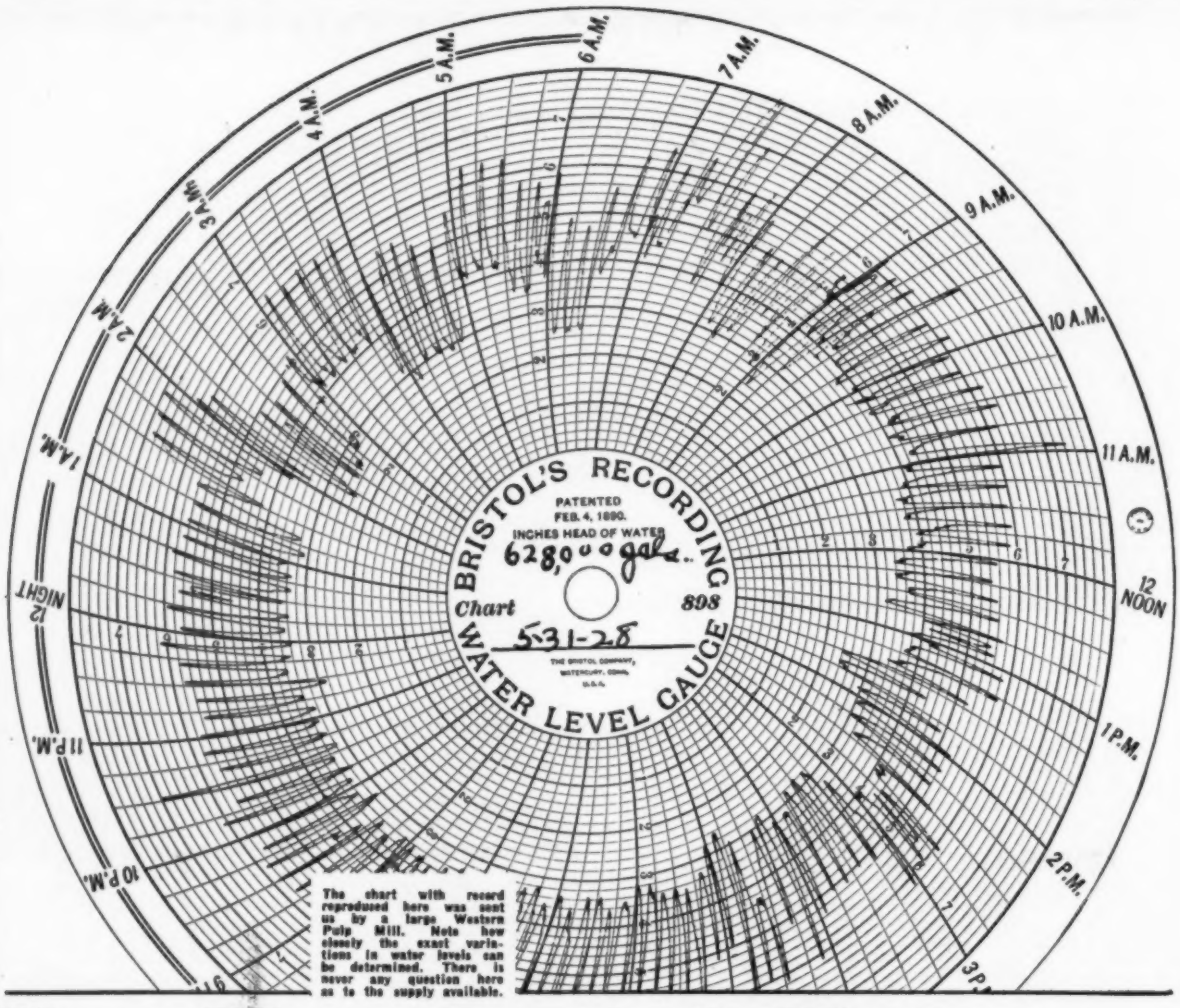


RELIANCE ELECTRIC & ENGINEERING CO.

1058 Ivanhoe Road Cleveland, Ohio

Branches: Birmingham, Boston, Buffalo, Chicago, Cincinnati, Detroit, Milwaukee, New York, Philadelphia, Pittsburgh, St. Louis, Toledo.

RELIANCE A·C D·C MOTORS



The chart with record reproduced here was sent us by a large Western Pulp Mill. Note how closely the exact variations in water levels can be determined. There is never any question here as to the supply available.

Your Water Supply Is Vital . . . .

Watch It!

EACH change in water level occurring over a period of 24 hours is shown in detail in the record line of Bristol's Recording Liquid Level Gauge chart reproduced above. Such a record is invaluable as a check on available water supply, and as a check on water used.

As indicated in the center of the chart approximately 628,000 gals. were consumed during the day this record was made. This information is important. When compiled in such a form as the above chart it is easily filed for future reference, and may be the means of preventing disputes or costly litigation. Bristol's Engineering Service is at your disposal in selecting suitable instruments for your particular needs. There is no obligation.

Catalog contains more complete information, prices, etc. Write for a copy for your files.

Bristol's Recording Liquid Level Gauge, shown complete with connecting tubing and sensitive bulb. Can also be adapted to record level of water, oil, cooking liquors, etc.

THE BRISTOL COMPANY, WATERBURY, CONNECTICUT

BRANCH OFFICES:
Boston
New York
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BRISTOL'S
SINCE 1889
Instruments *for* Indicating Recording Controlling

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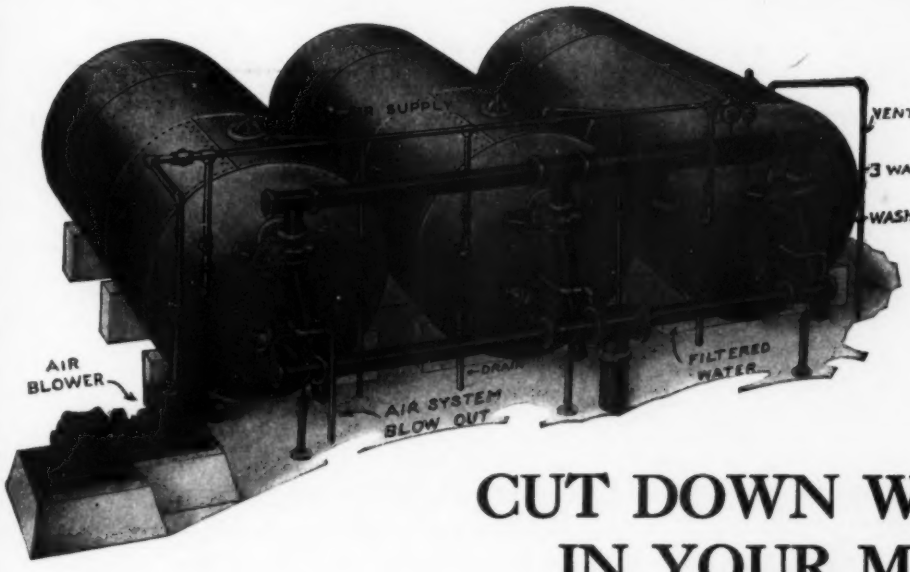

A three-unit installation of Norwood Steel Pressure Filters

CUT DOWN WASTE IN YOUR MILL

Typical installation of Norwood Gravity Filters

Why let the waste of spots, stains, off-colors, broke, and "seconds" be a constant drain on your profits—when this waste is avoidable? Why take the chance of shut-downs and defective sheets when these profit eaters can be guarded against?

Most of these troubles are traceable to defective water — and waste due to defective water is avoidable. Cut out this waste in your mill this year.

Efficient mills are cutting down waste by using efficient filters—and pretty close to 95% of all paper mill filtration systems are made by Norwood. Ask Norwood's engineers to help you check your troubles against your water supply.

Norwood Engineering Co.
16 No. Maple Street
Florence, Mass.

You can't go wrong with a Norwood Filter, calender, plater, duster, rag thrasher, folding machine, suction box or other paper mill equipment installation.

Norwood Engineering Co.,
16 No. Maple St., Florence, Mass.

Send Filter Catalog....Gravity....Pressure.

....Have engineer call when next in this vicinity.

....Will filtration help us get rid of the trouble described on attached sheet?

Name .....

Firm .....

Address .....

CHEMIPULP PROCESS INC.

FOREMOST IN SERVING CHEMICAL PULP MILLS

TO — Improve efficiency.
— Reduce costs.

BY — Modern scientific methods.
— Wide operating experience.

Bates Processes:

A method of purifying green liquor in SULPHATE PULP MANUFACTURE, resulting in — more economical causticizing — in shorter time — caustic recovery increased — producing clean lime sludge for use in the acid SULPHITE process with resulting economies in lime and better operation.

A method of causticizing in SULPHATE and SODA pulp liquor making — using countercurrent flow to give uniformity — improve cooking liquor — reduce lime — proven results — without expensive equipment.

Hovey Process:

A novel means of attaining uniformity throughout SULPHITE digesters — equalizes temperature zones — smooths out the difficulties of non-uniform quality — increases yield and strength — reduces cooking time — marked saving in bleach.

Chemipulp Process:

Hot SO_2 Liquor & Gas Recovery — eliminates expensive cooling equipment — recovers heat — saves steam — eliminates acid dilution from steam condensation — reduces boiler load peak — strengthens acid — accelerates penetration — cuts sulphur — increases yield and capacity — has been termed, "the all round fixer" for SULPHITE making.

Complete coverage of patents owned and controlled by:

CHEMIPULP PROCESS, INC.

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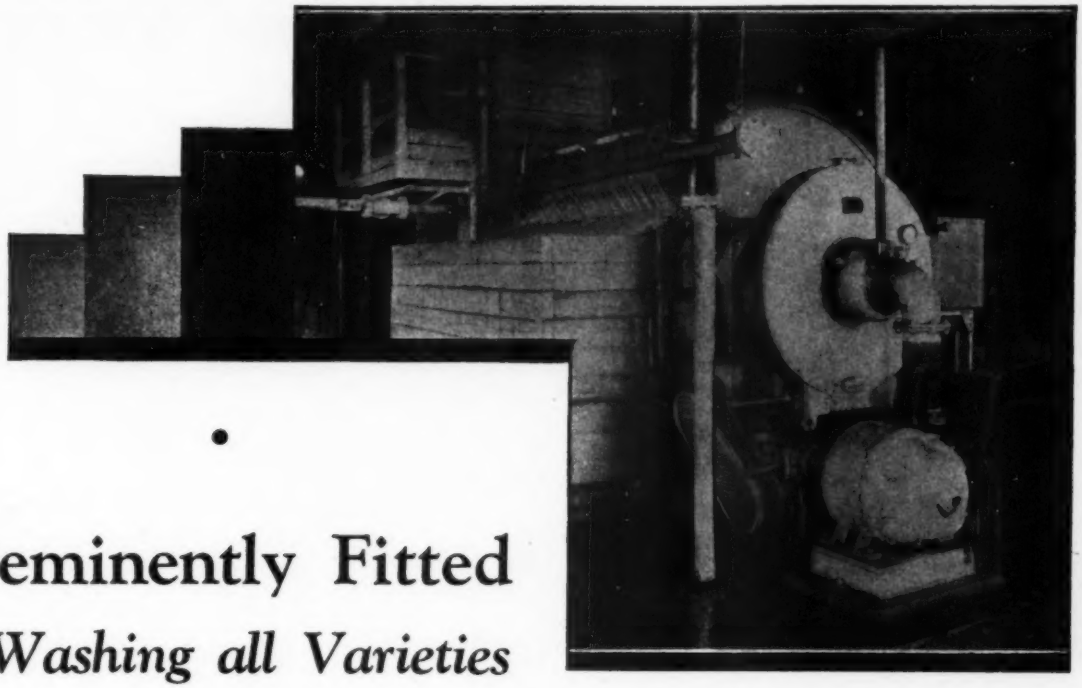

Preeminently Fitted

for Washing all Varieties of Brown Stock . . . . Either Soda or Kraft

. . . black liquor sent to evaporators hot and highly concentrated making large savings in fuel

. . . stock delivered to beater chest uniformly washed down to lowest point due to easy and close control

. . . all fibers removed from black liquor

. . . small building space required

. . . economical in labor

THESE ADVANTAGES of Oliver Brown Stock Washers account for the sale of scores of units.

They account for the sale of two large units recently made for washing kraft stock in a southern mill.

The mill that washes its stock on the Oliver Brown Stock Washer is operating at the maximum efficiency and with minimum cost.

AGENTS

TIMMINS, ONTARIO — B. D. Kelly
HALLE, GERMANY — Wilhelm Lill
SCHEVENINGEN, HOLLAND and SOERABAIA, JAVA — Van Lelyveld & Co.
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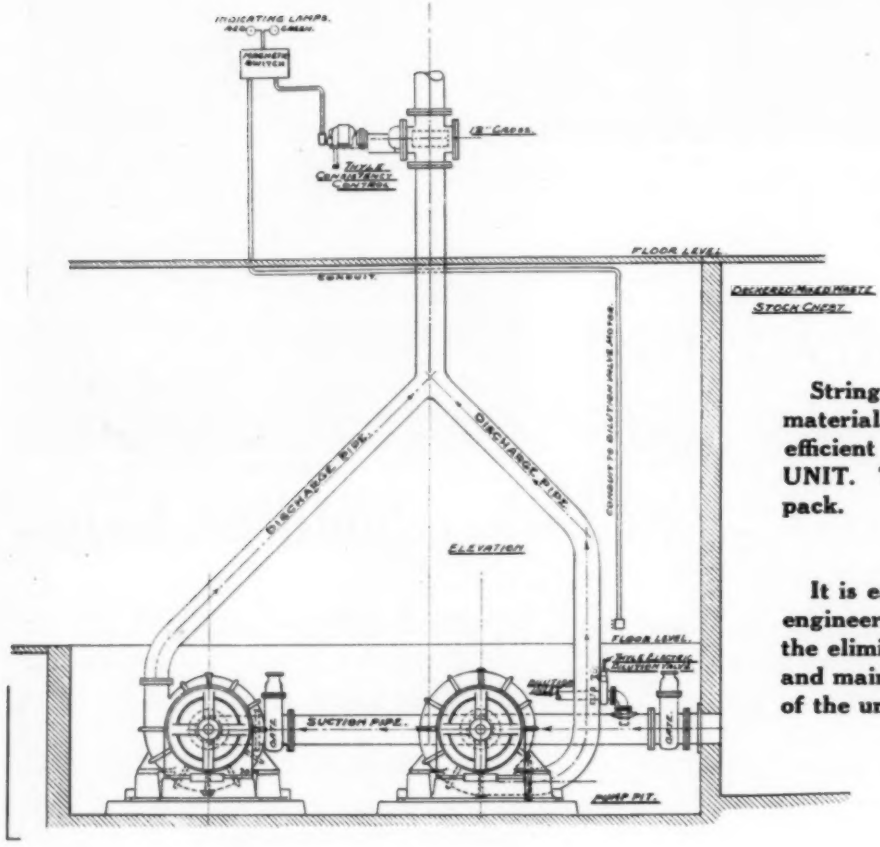
Factories: Oakland, Calif., Hazleton, Penna., Peterboro, England
Cable Address: OLIUNIFILT

CONTROLLING MIXED WASTE STOCK IN A CALIFORNIA BOARD MILL



Strings, rags or other extraneous materials do not interfere with the efficient operation of the THYLE UNIT. The unit does not block or pack.

It is easily installed by your own engineers in a few hours time and the elimination of manual attention and maintenance cost are but a few of the units predominating features.

Another of the many THYLE CONSISTENCY CONTROL UNIT installations that are being made in mills maintaining a uniform stock consistency.

The THYLE UNIT will maintain a stock with a consistency tolerance not to exceed .1 of 1% plus or minus from a given setting. Actual running test showed that for 24 to 36 hours the maximum tolerance did not exceed .04 of 1%.

The installation of THYLE CONSISTENCY CONTROL UNITS in your mill will guarantee uniform caliper and weight.

Thyle Machinery Company

"Specializing in Pulp Control"

514 Bryant Street San Francisco, California

Exclusive Agents for the Empire of Japan: American Trading Co., Ltd.

THE SANDUSKY VACUUM FORMING MACHINE
POINTING THE WAY
TO GREATER PROFITS
$
Particularly suitable for making medium and heavy weight boards, felts and roofing in sheets of one, two or three plies.
Illustrating two-roll machine, 114" wire, making .009 corrugating. In successful operation nine months, effecting increased speed, improved quality and greater tonnage. This machine is one of three commercial installations.

The Paper & Textile Machinery Company will cooperate with such paper machine builders as mills may prefer who are in a position to build the Vacuum Forming Machine through licenses granted by this company. Write today for recommendations regarding the application of this machine to your products.

» » »

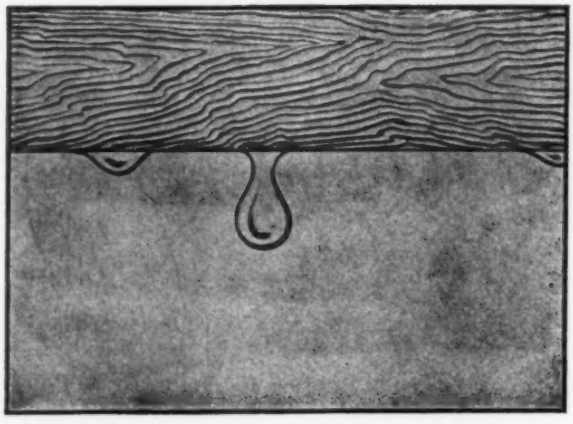
The

Paper & Textile Machinery Co.

Sandusky, Ohio.

» » »

Stop this Drop!



There are several ways.. *but insulation is most economical in the end*

DROP by drop ceiling sweat (the ordinary name for condensation on the under side of roofs) forms moisture on the ceiling of your machine room. How can you keep it from falling on the paper and machinery beneath?

There are several ways, as every paper man knows. Perhaps the most common is to cover the machines with strips of felt or canvas to catch the drops. Another way is to install costly, complicated systems of steam pipes to heat the under side of the roof. These methods are, of course, makeshifts. They do not remove the cause of ceiling sweat.

But the simplest, surest way to check condensation is to protect the roof of your machine room with adequate insulation, carefully and properly installed. When you apply Armstrong's Corkboard for this purpose, you accomplish three things, any one of which repays the cost in a short time:

First, you stop ceiling sweat permanently. The ceiling of the cork-insulated roof stays warm—there is no chill to condense the moisture in the warm, damp air of the room. Second, you stop the loss of costly heat, escaping through the roof. Fuel bills will be noticeably lower. Finally, your roof will last longer. Cork resists moisture, the cause of roof rot. Roofs insulated with corkboard last many years longer than uninsulated roofs.

Paper mills throughout the country are learning the wisdom of adequate roof insulation. They have found that Armstrong's Corkboard is easy to lay—no special tools or skilled workmen are required. It goes down right over the regular wood or concrete roof deck. And because it is manufactured in a wide range of thicknesses, you can use just the right thickness to take care of your insulation needs in one layer—a decided saving in installation costs.

Send for a free copy of the book "The Insulation of Roofs to Prevent Condensation." It contains much valuable information. Address Armstrong Cork & Insulation Company, 904 Concord Street, Lancaster, Pennsylvania. Canadian offices in Montreal, Toronto, and Winnipeg.

Armstrong's (A) Product

This close-grained, sturdy cork texture of Armstrong's Corkboard is your protection against ceiling sweat and roof rot.

Armstrong's Corkboard Insulation

for the Roof of Every Building

Why Quality Felts?

Service and the satisfaction to the mill that comes from the use of felts that are made for their definite requirements are the reasons why the Appleton standard of high quality is rigidly maintained. To assure this quality, Appleton Felts and Jackets are designed as quality products, and made as absolutely uniform as a plant control of every operation in their manufacture can make them—a check and control that always parallels our production. Using Appleton Felts and Jackets is your guarantee of service—and satisfaction.

Our 40 years experience is at your service — anytime — to solve your felt problems.

APPLETON WOOLEN MILLS
Appleton, Wisconsin

Appleton
Felts and Jackets

Padlocked Minds

have no use for a Business Paper...

IT'S not so much *what* you read that counts, as what you read it *for.*

Reading to pass the time away is *one* thing—reading to get *ideas* for improving your business is another.

Men completely satisfied with what they have—insensible to progress—oblivious to change—these read (*when* they read) for entertainment only.

But men whose minds are open to better methods, men whose minds are eager for news of new plans and new practices—these are the men who read the pages of their business papers.

In any industry . . . trade . . . profession, these are the men who count. And just as they are attracted to a publication by the practical, helpful character of its editorial content, so, in the same open-minded mood, they read its advertising pages.

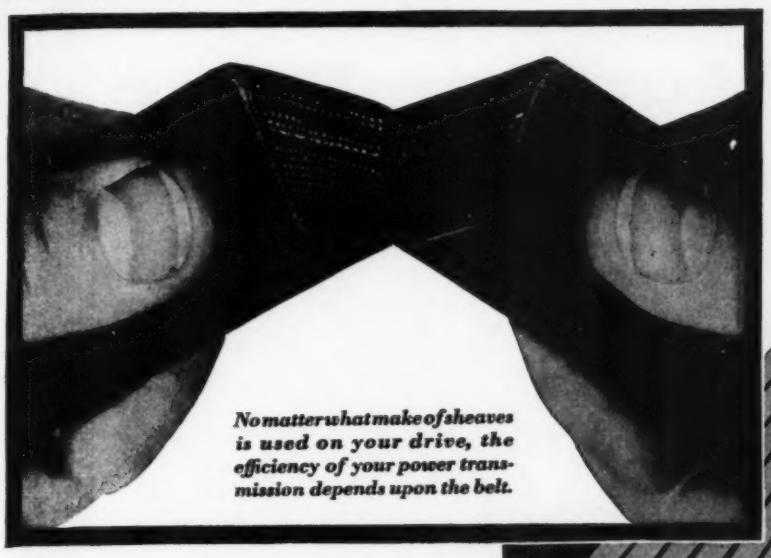
ABP

THIS SYMBOL *identifies an ABP paper . . . It stands for honest, known, paid circulation; straightforward business methods, and editorial standards that insure reader interest . . . These are the factors that make a valuable advertising medium.*

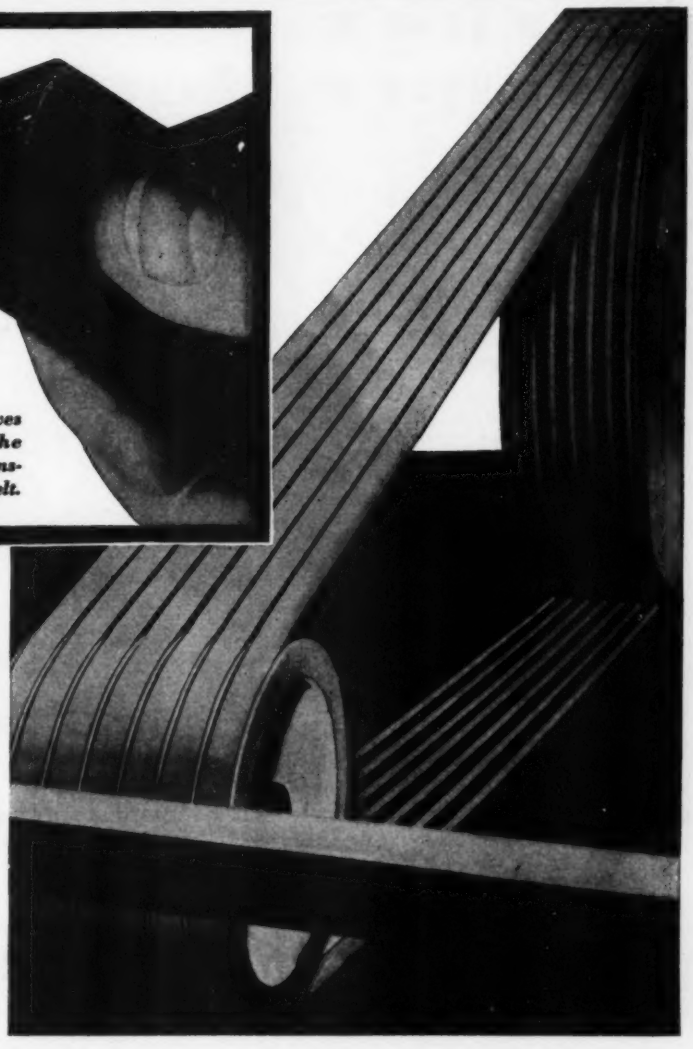
THE PAPER INDUSTRY is a member of

THE ASSOCIATED BUSINESS PAPERS, INC.

TWO-NINETY-FIVE MADISON AVENUE - NEW YORK CITY



No matter what make of sheaves is used on your drive, the efficiency of your power transmission depends upon the belt.



Put it up to GILMER V-BELTS

THERE are two major factors back of Gilmer V-Belts that are of vital importance to every user, present and future . . . First, the knowledge and long experience of this great engineering company devoted to the manufacture of the finest V-Belt it is possible to design . . . Second, a wide-spread organization of Mill Supply Houses placed strategically to give you instant service on all your V-Belt needs.

"V-Belts by Gilmer" is a symbol of superlative performance. No matter from what source they come . . either as standard equipment on machines you buy, or offered to you by your Supply House as replacements on your sheaves . . . you can be sure of longest life, greatest efficiency and least final cost *when you put it up to Gilmer V-Belts.*

L. H. Gilmer Co., Tacony, Philadelphia, Pa.

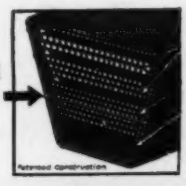
Gilmer

Makers of the World's Best-Known V-Belts

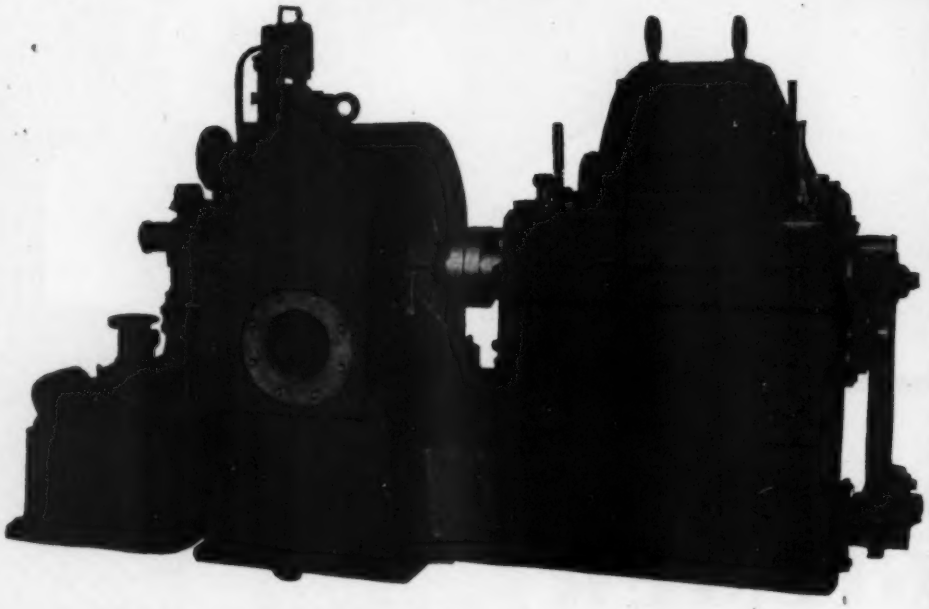
For Instance . . .

THE NEUTRAL AXIS

Remember . . . a V-Belt Drive is no better than the belt . . . Numbered among Gilmer's proven advantages is its construction with respect to the neutral axis . . . a feature that definitely conquers the internal friction that arises in ordinary V-Belts . . . In Gilmer V-Belts, superimposed layers of extra strong cords, placed at the point where neither tension nor compression take place, transmit the load without stretching or setting up internal friction. This feature was originated by Gilmer Engineers and is a vital point in giving Gilmer V-Belts their unsurpassed lasting qualities.



TERRY
Paper Machine Drive



400 H.P. Terry Paper Machine Drive. 6:1 speed range. Equipped with remote speed control.

TEN INSTALLATIONS
IN SIX YEARS FOR ONE COMPANY

In 1925 one of the country's largest paper manufacturers installed its first Terry Turbine Paper Machine Drive. The unit was so satisfactory and showed such a marked improvement over previous practice that two more units were shortly added.

Since then, as expansions have been made and new mills built, Terry units have been purchased exclusively. Today the ninth and tenth machines for this company are under construction.

A request on your letterhead will bring a description of these drives. Ask for bulletin S-89 or consult a Terry engineer.

The TERRY STEAM TURBINE COMPANY
TERRY SQUARE, HARTFORD, CONN.
Steam Turbines - Gears - Shaft Couplings

T-1080

THE PAPER INDUSTRY

REG. U. S. PAT. OFF.

Vol. XII MARCH, 1931 No. 12

The Development of Paper Manufacture from Southern Pines[1]

By R. H. STEVENS

Bogalusa Paper Co., Bogalusa, La.

THE past decade has seen a phenomenal growth in the manufacture of paper in the states bordering on the Gulf of Mexico. This region enjoys unique advantages in having cheap raw materials and fuel, abundant supplies of good water and labor, and favorable location with respect to markets. Appreciation of these advantages was delayed until recent years, however, by a combination of circumstances, including tardy development of southern industries generally, lack of technical knowledge, abundance of low cost papermaking materials in other sections and insufficient demand for pulp products of the types obtainable from southern resources.

Nowhere do pine forests reproduce themselves so rapidly as in the Gulf Coast region. According to the **Southern Forest Experiment Station Circular No. 124**, issued on October, 1930: "On average soils, full stands of second growth longleaf pine produce in 20 years 15 cords of pulpwood to the acre from trees four inches in diameter and up; shortleaf pine in the same time 18 cords; loblolly pine 28 cords; and slash pine 36 cords." On this basis, 30,000 acres of slash pine should sustain a 100-ton-per-day pulp mill on a 20 year crop rotation.

Such lands can be bought for from two to ten dollars on acre according to location. They are priced this low because the timber, which had a stumpage value from three to ten times these figures, has already been removed and the land itself is unsuitable for agriculture. At the present time, existence of large areas of this cut-over land constitutes a serious economic problem in the south. Some of the states, notably Alabama and Louisiana, have forest taxation laws designed to encourage reforestation. Other states will doubtless adopt similar policies in the near future. Lands that were logged off completely by the old style "timber mining" operators and subjected to the universal practice of grass burning in the fall and winter, show little or no second growth, but can be planted to pine at a cost of five or six dollars an acre. Where, however, intelligent logging methods have provided residual seed trees and where an awakened public conscience has prevented the destruction of young seedlings by grass fires, yields such as those reported in the above mentioned Forest circular may confidently be expected.

Alabama, Louisiana and Texas abound in salt, sulphur and lime, which provide the chemical agents required in the manufacture of paper from the southern pines. The oil, gas and coal from these three states provide adequate fuel at minimum cost to say nothing of sawmill waste now being burned for disposal without benefit. Artesian wells of moderate depth along the coastal plain supply clear water of minimum hardness while that from rivers, creeks, and bayous requires only filtration to make it suitable for use in paper manufacture. Southern industry is fortunate also in having an abundance of intelligent native white labor. Machinists, millwrights and other skilled and semi-skilled workers are readily obtainable at reasonable wages in this mild climate. And for rough unskilled operations requiring only a strong back and willing heart, there is the southern negro whose output under an under-

[1]Originally presented at the annual meeting of the American Institute of Chemical Engineers, held in New Orleans, December 8, 9 and 10, 1930.

standing white foreman few can equal and none excel.

Opportunities Opened for South's Industrial Growth

Industrial development came later to the south than to other sections of the United States because the older social system, founded on slave labor, was primitive, patriarchal. The old planters rejoiced in isolation and opposed industrialization. The Civil war left the south exhausted, retarding her development still further. Consequently there was not, until recent years, a largely developed southern market capable of consuming manufactured products including paper. Virgin forests in the Eastern and Lake States supplied an abundance of pulpwood at moderate cost to a well established paper industry. Finally, however, rising costs of production, due to depletion of virgin stands and keener competition of other industries for the available labor supply in older paper producing regions created a favorable opportunity for the south.

The first attempt to make paper from southern pine was by Smith and Thomas in Pensacola, about 1903.[12] Their experimental plant was visited by a lumberman of Orange, Texas, who bought all the equipment and incorporated it in a mill at Orange which began operation the following year. This mill employed the "soda" process, cooking the wood chips with sodium hydroxide. In 1911 this was changed to the "sulphate" process in which part of the sodium hydroxide is replaced by the sulfhydrate. In 1913, the second mill to use southern pine for paper manufacture was built at Moss Point, Mississippi. In spite of what had been accomplished at Orange, there was still so much skepticism as to the possibility of establishing a successful paper industry with southern pine as a raw material that it was found necessary to finance the Moss Point mill in England. Before the mill was built, a shipment of the wood was sent to Billingsfors, Sweden, where it was made into sulphate pulp, both bleached and unbleached. These pulps were taken to England and made into kraft wrapping and white book papers. This demonstration convinced British investors and the Southern Paper Company was financed forthwith.[21]

Two years later, in 1915, a mill at Braithwaite, Louisiana, on the Mississippi river, some 20 miles below New Orleans, was converted to a sulphate mill for southern pine. It had been built originally in 1898 to make paper from bagasse, but was unsuccessful. This mill is still in operation.[17] About the same time, work was begun on a mill at Bogalusa, 70 miles northeast of New Orleans. It was not until 1918, however, that the Bogalusa Paper Company got into production. An earlier mill in the same locality had failed by reason of faulty engineering.

About 1920 another sulphate mill was built at Bastrop, Louisiana, and three years later a small (30 ton) mill using the soda process was erected at Elizabeth, Louisiana. The latter soon failed, but was rebuilt as a sulphate mill a year or two later and is still operating. In 1924 some of the Orange lumbermen built a mill at Monroe, Louisiana, and two years later another one was built at Bastrop. The year following, a mill was built in Arkansas, at Camden, 80 miles northeast of Bastrop, and still another at Hodge, Louisiana, 50 miles west of Monroe. About this same time, work was begun on a mill at Tuscaloosa, Alabama, by the interests controlling the mill at Braithwaite and another followed soon after at Mobile. The latter was built by the same organization which had built the Arkansas and the Bastrop mills and taken control of the Mississippi mill. Another one is now nearing completion at Panama City, Florida, and there are persistent rumors of two or three more paper mills to be built in this favored region in the near future. These mills have a combined capacity of 540,000 tons a year which is 52 per cent of the present national consumption of sulphate pulp products.

Another factor which gave impetus to the rapid expansion of southern paper manufacture was the rise of the shipping container industry. The inauguration of the parcel post in 1912 greatly increased the demand for light weight boxes as did also the rising cost of even low grade lumber. And the development of modern merchandising methods of sales in original standardized package at standardized retail prices in all sections of the country did much to increase the demand for both corrugated and solid fiber shipping containers. The World war cut off imports of Scandinavian kraft pulps which had been rapidly displacing jute as the raw material for these containers. Several of the southern mills just mentioned were originally built to supply kraft pulp to container liner mills in the middle west. Some, like Bogalusa, engaged in the manufacture of the liner but made more pulp than their board machines required, shipping the remainder as pulp to the "jute" mills farther north. Establishment of container factories in the south soon followed as the section developed industrially.

The Sulphate Process

The sulphate process, employing sodium sulfhydrate and hydroxide as the active chemical reagents, takes its name from the fact that commercial salt cake (anhydrous sodium sulphate) is used to supply the alkali. The first commercial application of this process was at Danzig, in 1884. The inventor, C. F. Dahl, added the salt cake in the digester charge where it is really inert, but becomes active upon reduction to the sulphide with carbon in the recovery operation. An interesting tale has been told of how a carload of salt cake was missent to the soda pulp mill instead of to a glass factory, which in turn received the soda ash intended for the pulp mill. The

error was not discovered until the odor of mercaptan became noticeable. Then a chemist was called in to investigate and discovered the substitution. This makes an entertaining story, but the truth seems to be that Dahl put the salt cake into the digester in order to avoid infringing a patent granted to Aussig two years previously on the process of cooking wood with sodium sulphide.[20] Today the salt cake is fired into a blast furnace together with either the black ash, resulting from evaporation of spent liquor from a previous cook, or else with the concentrated liquor in the spray-in type of furnace. The molten alkali issuing from the furnace is a mixture of sodium carbonate and sulphide which after causticizing becomes the cooking reagent.

Comparing this reagent with that of the "soda" process, sodium hydroxide alone, some very marked differences are seen. The most obvious is the presence of methyl mercaptan in the products of the reaction. This compound, which Kirchner[12] says "has the highest specific intensity of **stink** of any known substance," plays no small part in determining the proper location of a sulphate pulp mill. Other results of the partial substitution of sulfhydrate for part of the hydroxide are: shorter cooking time for the same pulp yield; easier bleachability of the pulp for the same yield; higher yield of stronger pulp from the same wood, and less alkali required per unit quantity of wood.

The presence of two active agents in place of one introduces an additional complication. Practical mill men disagree as to the proper ratio between hydrate and sulfhydrate. Some claim that if the "sulphidity" of the liquor drops below a 2.5:1 ratio, the pulp ceases to be "kraft" and becomes "soda." Others report that pulp cooked with 5:1 ratio still has the properties of "kraft." The truth is that the quality of the pulp shades off gradually and there is no sharp dividing line between "kraft" and "soda" pulps from the same wood. Replacing as little as two per cent of the sodium hydroxide by the sulfhydrate alters the character of the pulp to a discernible extent.

Besides the "sulphidity" the ratio of the active alkali to quantity of wood used and the actual concentration of the "active alkali" are governing factors. Apparently the concentration governs the yield and the alkali ratio determines the quality of the pulp for a given cooking cycle.

The fundamental chemistry of the cooking process appears to have received less attention from research chemists than has been bestowed upon the sulphite process. It has been suggested that the sulfhydrate reacts with the methoxyl group of the lignin in the wood, forming the mercaptan and a water soluble sodium ligno-compound. Thus:

$$R\,O\,\boxed{CH_3} + S\,\boxed{H}\,Na \rightarrow RO\,Na + CH_3\,SH.$$

That this is not the whole story is at once apparent from the fact that much less than the amount of sulfhydrate theoretically required to satisfy the above equation is commonly used in the manufacture of sulphate pulp.

It has also been suggested that the greater strength of sulphate pulp as compared with soda pulp from the same wood is due to the reducing atmosphere in the digester, owing to the presence of the sulphide, which prevents formation of "oxycellulose." Just why the latter should be formed when cooking with straight sodium hydroxide, is difficult to explain any further than to attribute it to the influence of air trapped in the digester when charged. A study of the differences in chemical composition of pulps cooked by the two processes with approximately the same yield, shows that the sulphate pulp is higher in alpha-cellulose and lower in substances capable of reducing copper sulphate in Fehling's solution. The latter are supposed to be degradation products of cellulose. The greater purity of the sulphate pulp is sufficient reason for its superiority, but the reason for its greater purity is yet to be explained.

It is common practice to prepare the "white liquor" with a higher concentration than is required for the digester charge. This is then diluted to the proper amount with "black liquor," i.e. spent liquor from a previous cook. The original idea appears to have been to maintain as high concentration as possible in the black liquor going to the evaporators. Another benefit is realized, however, in that the cooking reaction is accelerated and the resulting pulp is stronger than if water were used for the dilution, even when the small amount of active alkali remaining in the black liquor is taken into consideration. Just why this should be so is another puzzle.

Besides the hope of finding the answer to these puzzling questions, fundamental research in the chemistry of the sulphate cook is needed in order to secure better control of the process. Too often the product of a series of cooks, even in the same digester, will vary astonishingly and the paper mill always blames the pulp mill when the paper quality is not up to standard. This lack of uniformity could be overcome almost entirely if it were possible to proportion the digester charge accurately and determine the end-point of the reaction correctly. A prerequisite for the first requirement is some means of measuring the amount of wood charged. Such means already exist, it is true, in the form of weightometers or similar equipment, but the pulp mill builder has not yet seen fit to adopt them. On the other hand, the accuracy of measurement of the chemicals charged leaves little to be desired in most mills.

No satisfactory means for judging the end point of the reaction has yet been devised. In some mills, a sample cock is provided through which a small amount of the pulp is blown. This is then judged

by visual inspection, or its "hardness number" may be obtained by permanganate titration. This has not proved entirely satisfactory, however, as the required pulp qualities are not entirely governed by the oxidizable material present. A better method of determining the end point might be by some chemical or physical test applicable to a sample of the liquor taken from the digester. At first glance it would appear that the controlling factor must be the hydroxyl-ion concentration and the end-point should correspond to a certain minimum value. Consequently potentiometric e.m.f. measurements and also conductivity have been studied. It was found, however, that hydroxyl-ion concentration is not the sole governing factor and that conductivity measurements are complicated by presence of a complex mixture of ions of different mobilities.

The earlier sulphate mills employed tumbling digesters almost exclusively. Later tendency, however, is in the direction of stationary digesters of larger size with forced circulation by means of a pump. Cooking is either by direct steam or indirectly by a heater through which the liquor is circulated. There are two systems for the latter. The first, known as the "Morterud" withdraws the liquor from the bottom, forces it up through the heater and back into the digester near the top. In order to overcome troublesome channeling of the liquor through the mass of chips, the newer Schauffelberger system takes the liquor out through a perforated belt course around the middle and, after heating, returns it through both top and bottom. A still more recent innovation is the "Albenielsen" system which accomplishes a preliminary concentration of the liquor by "flashing off" steam from the heater. Of these systems only the Morterud is employed in any of the southern mills. It is customary to employ indirect heating only during the preliminary period, up to about 90 pounds pressure. Beyond this point direct stream is more economical. Furthermore at higher temperatures hot-well corrosion of heater tubes is likely to occur.[13]

The cooking cycle, whether in tumbling or stationary digesters, with direct or indirect steam, consists of three periods, viz.—a penetration and temperature raising period, a full pressure period and a gassing down period. In some mills the latter is omitted, cooks being blown at full cooking pressure. This may, however, cause some damage to the fibers by excessive "explosion." The penetration period need not be so long as in sulphite cooking, but is just as important. During this period, gaseous products are relieved from the top of the digester. It is possible to produce good pulp without any "full cooking pressure" period. In this case, the temperature is raised rather slowly over the entire time and the cook "blown" when the maximum pressure is reached. For, unlike the straight soda cook, the sulphate liquor is active throughout the entire cooking period after a temperature of 120 deg. Cent. has been reached.[14] Higher temperatures naturally speed up the reaction. According to Bray[2] a rise of ten degrees Centigrade doubles the speed of reaction. Pressures as high as 175 pounds have been used with perfectly good results, but not in any of the southern mills. The old style operators insist on regulating the digester operation by the pressure gauge, but the proper method is, of course, according to temperature since gaseous products may be formed faster than relieved. Automatic time-temperature control is obviously desirable, but should be preceded by the two essentials already mentioned.

Condensation of the gaseous products already mentioned yields an oil that is mainly turpentine contaminated with mercaptan and an aqueous solution containing methanol and trimethylamine.[19] The mercaptan can be fractionated out and converted to dimethyl sulphate, but some of the other sulphur compounds that accompany it are more difficult to dispose of. Of these by-products, only the turpentine has yet been obtained in marketable condition and this at only one of the mills of the Gulf States region. Under present market conditions, not even by-product sulphate turpentine can be sold at a profit.

Recovery of Chemicals

The use of an alkali cooking reagent would not be economical without recovery of chemicals. It is here rather than with the cooking operation that the chemical engineer has busied himself. The cook is blown either directly into a diffuser or through a cyclone discharging into a diffuser, washpan, or vented tank of some kind. Diffusers are used in all but one of the southern mills which has recently adopted the Swenson rotary filter. All previous attempts at washing southern kraft pulps in this way had failed on account of the excessively foamy character of the black liquor from these highly resinous woods. Other means suggested are, the Kuntztown press, the screw press and the centrifugal extractor, but none of these have been tried in any southern mill. Whatever method may be used, the aim is to reclaim the chemicals as completely as possible with minimum dilution. To this might be added also that the investment and labor costs must likewise be kept at a minimum. One great need is some automatic recording instrument that will measure the dilution of the liquor in washing. The foamy, gummy nature of the black liquor has prevented the usual displacement type of specific gravity meter from being adopted generally and the lack of suitable insulating material hinders the use of conductivity equipment.

The black liquor from the highly resinous southern pines contains a large amount of rosin soap. This causes a frothy scum to form on the surface, or sink as a soft soap to the bottom of the storage tank. If separated by suitable means and acidified with a

cheap mineral acid, a viscous sticky oil, half resin-half fat, is obtained. In European mills, this is collected and refined for use in soap making and for other purposes. In this country, however, where both gum and wood rosins are so cheap, its preparation offers slight hope of profit.

The concentration of the black liquor takes place first in vacuum evaporators, usually Zaremba or Swenson, though others are used also to lesser extent. These bring up the density from 10 deg. or 12 deg. Bé to 20 deg. or 22 deg. Bé (hot test) after which it is fed to some form of waste heat evaporator, such as the Enderlein disc or Carlson, or Waern type, or else is further evaporated in some form of rapid circulating concentrator, such as the Swenson. The latter is used only with the spray-in type of furnace, such as the Wagner. The former are placed in the flue from the usual rotary incinerator which follows the blast furnace, or "smelter." The rotary is usually very short (about 20 feet) and lined with fire brick. The flames from the smelter are drawn through it by induced draft and complete the evaporation of the liquor to a black ash. It is here the salt cake is applied, being mixed with the black ash and fired into the smelter. The latter may be either square or circular and sometimes there are two connected to one rotary. Soap stone blocks, 12 inches thick, are commonly used for lining, though chrome brick are also employed. The air blast is through water-cooled nozzles and the furnace top is also commonly water-cooled.

As the carbon burns out of the black ash, it reduces the sulphate to sulphide. The reclaimed alkali is almost entirely in the form of carbonate. The mixture of sulphide and carbonate melts and runs out from the furnace over the surface of a grooved "spout" that is either water cooled or of soapstone.

The spray-in type (Wagner) furnace differs from the "smelter" in that the liquor is concentrated to about 70 per cent solids and sprayed into the furnace instead of first being evaporated to an ash. The salt cake is sifted in along with it and reduction occurs just as with the "smelter." The Wagner furnace is provided with water tube arch and water tube upper walls. Instead of a rotary and disc evaporator, a three pass water tube boiler is placed back of the furnace and followed by a scrubber. In only one of the southern mills are waste heat boilers installed after the ash fired furnace as in some of the Lake States' mills.

There is still some question as to the respective merits of the ash-fired smelter as compared with the spray-in type. The Braithwaite mill combined both in one, using a long rotary and firing black ash mixed with salt cake and also spraying in concentrated black liquor. Thus with one unit, consisting of two smelter furnaces connected to one 40-foot rotary, a production of 40 to 50 tons of pulp was maintained as compared with 25 to 30 tons for the usual single smelter and short (20 ft.) rotary. The Wagner, spray-in type, furnace has about 30 tons capacity and yields steam as a by-product. Theoretically it should be possible to obtain from the fuel contained in the black liquor enough heat to supply the entire needs of the pulp mill for cooking, evaporating and causticizing. This ideal has not yet been realized in any of the southern mills so far as the writer is informed, but the adoption of the spray-in type furnace is a step in that direction. Some "practical" mill men, however (especially those who have never seen one in operation), are convinced it will never be possible to obtain with this type of furnace so good reduction or recovery as with the ash fired smelter. Actual operating experience does not bear out this contention.

The alkali recovered from the previous cook is almost entirely in the carbonate form, therefore the "Sulphidity" of the cooking liquor depends on the amount of salt cake used. Consequently, reports of 40 to 45 per cent "sulphidity" with salt cake consumption of little more than 200 pounds per ton of pulp are scarcely credible. In order to increase the "sulphidity" some of the mills have used nitre cake (sodium bisulphate), but this is no longer available in large quantities because of increased demand in the rayon industry and also decreased production due to the shift in methods of production of nitric acid.

The quality of the salt cake is very important. Less than 94 per cent of sodium sulphate means poor economy of operation. Silica, alumina and iron appear to be the most objectionable impurities since they retard the rate of settling of lime sludge in the caustic room. If much iron be present, a double sulphide of iron and sodium may be formed which is troublesome to remove and which produces a greenish gray color in the pulp which is very difficult to neutralize in the finished paper. Chrome salt cake commonly has a higher melting point, if the chromium content is very appreciable, and this may shorten the life of the furnace lining.

In one mill using a natural salt cake, containing considerable gypsum, this reduced to the sulphide which later reacted with the sodium carbonate in the green liquor forming the sulfhydrate. A saving in lime resulted, but it would be poor economy to buy salt cake with high gypsum content in order to save lime. It is conceivable, however, that mills with a high lime cost and gypsum available at a low price might use the latter along with salt cake, especially if the lime sludge is being re-burned.

When Dahl began the use of sodium sulphate, he was shrewdly utilizing a waste product of little value. Today, however, decreased consumption of muriatic acid and the rise of the atmospheric nitrogen industry have completely changed the picture. Salt cake has become a main product of manufacture and is now being made in Louisiana by the Hargreaves

process from salt and sulphur with muriatic acid as the by-product. Natural salt cake (Thenardite) is found in Arizona and anhydrous sodium sulphate is produced from natural brines by fractional crystallization. Foreign salt cakes, some from the famous Stassfurt deposits in Germany, and some even from Chile, are obtainable at low cost by mills along the Gulf Coast. The producers of manufactured salt cake have asked for an import duty on the foreign product which is now admitted free. If granted, this would work serious hardship on the southern paper industry, unless a compensating duty were placed upon imports of sulphate pulp which is now on the free list also. In the long run, it would probably be best to make the United States independent of foreign sources of both salt cake and sulphate pulp.

The percentage reduction of the sulphate is a very important index of the efficiency of the operation, since there is always danger of re-oxidation of the sulphite. Consequently it is necessary to determine the sulphate content of the "green liquor," as the solution of the alkali from the smelter is called. Unfortunately the only really reliable method is by precipitation with barium chloride and weighing the barium sulphate produced. A reliable quick method of determining sulphates is very much needed.

Another tool which would increase the efficiency of the recovery operation is some means for automatically recording the analysis of the gases from the smelter. This possibility appears to have been overlooked heretofore. It is perfectly obvious, however, that the content of CO_2 and SO_2 in these gases could be correlated with other factors in determining optimum operating conditions. Similarly knowledge of the temperature in the smelter and in other parts of the recovery unit would lead to closer control. Even today, there is too much rule-of-thumb in the operation of the average recovery room.

Clarification of the green liquor by filtration or settling before causticizing aids the settling of the lime sludge, but this is practiced only in mills that re-burn the latter. Continuous causticizing is practiced in only one mill where the Dorr system has been installed recently. Filter washing of the sludge is, however, universal. Kelly filters are used at Bogalusa; rotary type in the other mills. The sludge must be washed very clean before re-burning, else troublesome nodules of lime-soda glass may be formed. Where natural gas is available at low cost, re-burning is profitable and convenient, but where oil firing is necessary, the results have been less fortunate. The writer has, however, seen lime sludge re-burned with powdered fuel apparently without difficulty, but this was not in the South. Without re-burning the lime consumption ordinarily runs around 450 to 550 pounds per ton of pulp. Re-burning can reduce this to as low as 75 pounds of fresh lime per ton of pulp. Other means of sludge disposal have not yet been developed except where dumping is practiced. The sludge is, of course, suitable for various purposes such as "sweetener" for acid soils and filler for asphalt road material. For neither of these, however, does the value exceed the cost of preparation and delivery.

Pulp Screening and Refining Operations

After the pulp has been washed, the subsequent operations differ but little from those common to other paper mills. Centrifugal pulp screens have displaced the older flat plate screen almost entirely though the latter are frequently used to reclaim fiber that has passed through the knotter. Oliver filters have come into general use for thickening the pulp after screening. Right here there is need of another tool. The "consistency" of the thickened pulp needs to be known and even controlled very accurately. This is not so hard to accomplish for concentrations of one or two per cent of fiber, but is much more difficult for densities of three to eight per cent. With the "consistency" known, or controlled within very narrow limits, the next requirement is a reliable metering system operable on the same stock. There is a real need for means for determining the amount of fiber passing through the wet room with an accuracy plus or minus one-half of one per cent.

The beating, jordaning and subsequent operations, are the same for the southern mills as for any others, except as the difference in character of the fibers may differ from those of other woods. Such differences do exist to a very marked extent due, apparently, to the fact that the southern woods make a much larger part of their growth during the summer and fall. Consequently, the spring wood forms a much smaller proportion of the total wood. The thick-walled stiff, coarse summer wood fibers predominate and give to this pulp corresponding characteristics. Under the microscope the fibers of the southern pines viewed beside those of northern pines appear like sticks of stove wood lying among willow switches. Just as the willow wands would form a tighter mat through which the water would drain more slowly, even so the spruce and northern pine pulps are characterized by the papermaker as "slower" pulps, while the southern pine pulps are "freer." These require harsher treatment to "subdue" them. Consequently the tendency in the South is to rely on jordans almost exclusively and to use larger volumes of water on the paper machines.

Still another tool which is very much needed by the papermaker, North as well as South, is something that will measure the "freeness" of pulp continuously and automatically. With the "consistency" known and regulated and the "freeness" under close continuous control, a large step forward would have been made in making the manufacture of paper "an exact science instead of a temperamental art."[18]

This expansion of paper manufacturing in the South during the past decade has resulted in over-

development. For, during the same period occurred a similar expansion on the Pacific Coast from which quarter have come recently cries of distress in the form of application for protection against dumping of foreign sulphate pulp. During the present year, several of the southern mills have been operating only part time. The Orange mill has closed down, probably not to resume operation. The Braithwaite mill is slated to suspend operations early in 1931, the machinery being removed to Tuscaloosa and consolidated with the mill there. It is rumored that another of the smaller mills will cease operations in 1931 also unless a change in the market situation should occur very soon.

New Products for New Markets

It has been said[8] there is now an excess capacity for production of sulphate pulp and pulp products of 1,000 tons per day. Yet, foreign sulphate pulp continues to enter—duty free. Obviously new uses must be found for it. The toughness and high tearing strength of the kraft pulp from the southern pines led to wide-spread use in the shipping container industry, as already mentioned. This same quality, together with the high purity of the pulp, made by the sulphate process, point to its superiority over other types of wood pulp for papers of high durability and permanence. For such papers obviously the color of kraft pulp is unsuitable. Consequently the next step should logically be the manufacture of bleached sulphate pulps of high alpha cellulose content, having the long fibers characteristic of southern pines.

This is not a new idea. Mention has already been made of the demonstration cooks at Billingsfor, Sweden, on wood from Gulfport, Mississippi, and the high grade book paper made from it. The Champion Fiber Company has been making bleached sulphate pulp for years at Canton, N. C., and several thousand tons of this has been made from southern pine wood, shipped from the Atlantic seaboard. This company, or rather its parent organization, The Champion Coated Paper Company, Hamilton, Ohio, is reported in the trade papers[16] to be planning a four machine book paper mill for Mobile. And at least one of the existing kraft mills of the South is reported to be in process of conversion to the manufacture of bleached products.

Recent researches at the Forest Products Laboratory in Madison, Wisconsin, have shown how best to obtain the desired combination of high yield, high strength and high bleachability from the southern pines.[5] Also how to bleach these pulps most economically.[6]

Another development of the Forest Products Laboratory[9] is a process whereby high yields of light colored (but unbleached) products can be obtained from the southern pines and also from southern hardwoods. By suitably blending these, it should be possible to make various types of papers not yet made in the South. Another suggestion from the same source[4] is the cooking of southern hardwood by the sulphite process to obtain short fibered pulps of bluish white cast to blend with long fibered bleached sulphate pulps which usually have just a faint yellowish tinge. Thus a white paper of good formation should be obtained by a reversal of the usual method of mixing a long fibered sulphite with a short fibered soda pulp.

An interesting development, which is altogether logical and should have occurred long ago, is the combining of the extraction industry, using pine stumps as raw material, with the manufacture of pulp products. Unfortunately, attempts heretofore have been directed mainly toward getting maximum extraction and solvent recovery first, and then duplicating existing quality of pulp and paper from the residue. The latter, however, was unavoidably damaged in the extraction process. It is necessary either to sacrifice yield in the first stage or lose quality in the second. By suitable choice of solvent, it is possible to combine the solvent recovery with the pulping operation and obtain fairly high oleoresin yields with average quality (and yield) of pulp. Unfortunately, this has not yet been attempted, in so far as the writer can learn, by any of the manufacturers at present operating stumpwood extraction plants. Recently, however, the Newport-Armstrong Company has undertaken the manufacture of roofing material from the extracted chips. And it is reported that one of the other companies is building a pilot plant for the manufacture of sulphate pulp for some purpose. During the World war, the writer prepared cellulose suitable for nitration from extracted pine stumpwood on a pilot plant scale by a process including a sulphate cook as one step. Unfortunately, the economical feasibility of the method had not been completely worked out when the Armistice terminated the effort. The idea merits further study, however, particularly by these organizations that operate extraction plants and also manufacture nitrocellulose.

From time to time the suggestion is made that chemists ought to be able to find a way to overcome the resinous nature of the southern pines and cook the wood by the sulphite process. McKee and Cable[15] worked on this idea for awhile trying to extract the resins with liquid sulphur dioxide. Others have tried various other solvents. All have found, however, that even thoroughly extracted heartwood resists the action of the sulphite acid while the sap wood can be pulped even without extraction. Just why this is the case has not yet been satisfactorily explained. The idea[7] that the resin of the heartwood differs from that of the sap wood and prevents this penetration is hardly tenable in view of the completeness of some of the extractions.

In order to avoid the troublesome heartwood some

mills, notably the Carolina Fiber Company, Hartsville, S. C., have used young heart-less pine wood exclusively. Even then, however, it is found the amount of screenings is high and the pulp "brashy." (The Hartsville mill has now abandoned the acid sulphite process and gone over to the neutral sulphite [1] or "semi-chemical" [9] process.) One difficulty with the acid sulphite process is the temperature of the water available in the South. At Bogalusa, for instance, artesian waters come out of the ground at 78 deg. Fahr. Surface waters are even warmer in the summer, though somewhat cooler in winter. Obviously it is impossible to prepare liquor with very high free SO_2 content without expensive refrigeration. Perhaps it may prove possible eventually to find some cheap method of compressing the SO_2 and forcing it into the digester after filling, thus maintaining any desired SO_2 content. Even then, however, it is by no means certain that high quality bleached pulp can be made from the southern pines by the sulphite process that will compete in cost and quality with those that can be made by the sulphate process. The writer confidently predicts that any white papers made from the southern pines will be made by the sulphate process for many years to come.

Another suggestion frequently heard is that the South should be made independent of foreign supplies of newsprint by manufacturing it from southern pine. It is urged[10] that the young slash pines, before they have developed heartwood, are not resinous and can easily be made into both sulphite and groundwood pulps from which cheap newsprint can be made. The suggestion seems premature, however, in view of the tremendous over-production of newsprint in Canada where hydroelectric power is cheaper than even in the South, and where abundant supplies of spruce, the pulpwood **par excellence**, still exist. The investment of a quarter of a billion of American dollars in Canadian mills may shock the sensibilities of some hyper-patriotic Southerners*, but the fact remains a stumbling block to the development of cheap newsprint in the South. And the recent closing of the higher cost Canadian mills and the tendency to amalgamate the remainder into huge combines, not to mention the projected erection of two huge newsprint mills in Alaska with their own hydroelectric plants, are further formidable arguments against investments in southern newsprint mills.

*The writer is a native of Florida.

References

1. Bradley, Linn and McKeefe, Edw. P. Tr. Journal, Convention No. February 21, 1929, p. 131, TAPPI.
2. Bray, Mark W. and Curran, C. E., "Reactions Variable of the Alkaline Pulping Process," Ind. & Engr. Chemistry, Vol. 22, p. 830 (1930).
3. Benedicks Handlingar, No. 60, Ingeniors Vetenskaps Akademien (1927).
4. Curran, C. E., "Present and Future Trends in the Pulping of Southern Woods," P. Tr. Journal, January 16, 1930, 4, 49, TAPPI, p. 25.
5. Forest Products Laboratory Reports 1929-30, "Strong Easy Bleaching Pulp from Loblolly Pine," Curran and Bray.
6. Forest Products Laboratory Reports, 1929-30, "Studies on Chlorine Bleaching Process," Doughty.
7. Ekenstam, Alf. Svensk Papperstidning, No. 4 (1930), p. 139, No. 11 (1930), p. 439, No. 12, p. 476 (1930).
8. Ellerson, Paper Mill, November 29, 1930, p. 12.
9. Forest Products Laboratory, "A Semi-Chemical Pulping Process," Paper Trade Journal, Sept. 23, 1926.
10. Herty, Paper Trade Journal, Convention No. 1929, p. 119.
11. Holmes, Geo. S., Manager of the Brown Paper Mill Company, Monroe, Louisiana (private communication).
12. Kirchner (book), "Das Papier."
13. Klein, A. S., The Paper Industry, Vol. 12, p. 679.
14. Kullgren, C., Handlingar, No. 60, Ingeniors Velenskaps Akademien, Stockholm (1927).
15. McKee and Cable, Doctor's Thesis, published in Paper Trade Journal, April 23, 1925, p. 151, Tappi Sec.
16. Paper Trade Journal, December 4, 1930, p. 42.
17. Penfield, W. E., Manager of Gulf States Paper Corporation, Tuscaloosa, Ala. (private communication).
18. Schaeffer, Earl R., Forest Products Laboratory coined this phrase.
19. Schorger, "The Chemistry of Cellulose and Wood" (book) p. 411 (1926). Note: Schorger's book contains a very complete bibliography.
20. Voght, Pulpwood Paper Magazine of Canada, Vol. 29, p. 799 (1930).
21. Wallace, Joseph H., Consulting Engr., N. Y. (private communication).

Note: An excellent "Bibliography of Papermaking, 1900-1928," has been prepared by C. J. West (Lockwood Tr. Jour. Co., 1928), p. 42.

Draft Gauge a "Key" Instrument

No other instrument serves as many useful purposes as the draft gauge, nor indicates so surely, swiftly and simply what is going on and at the same time differentiates between cause and consequence. The draft gauge, in fact, is indispensable for the intelligent manipulation and control of the fuel bed, of combustion and all it implies—damper position, rate of fuel feed, co-ordination of fuel feed and air supply, and the supervision of allied factors affecting combustion such as condition of gas passages, baffles, boiler settings, breeching, ash pit, etc.

The draft gauge in the power plant really falls into two distinct yet related classes: One is for continual supervision of combustion and the other for checking up and testing conditions, locating troubles, investigating and experiments. Practically all such difficulties as sudden furnace refractory failures, inability to maintain steam pressure or develop capacity, rapid arch deterioration, burned out grates, clinker, etc., can be brought to light through the use of the draft gauge for exploration. These two classifications call for two different types of gauges—the stationary and the portable.—Joule.

It is not often that a man can make opportunities for himself. But he can put himself in such shape that when opportunities come, he will be ready to take advantage of them.—Theodore Roosevelt.

Cost Accounting in the Paper Industry

Part XXI—Job Order Cost Systems (Cont'd)

By D. A. WILCOX

THERE is such a vast difference in the equipment of various paper-mills, as well as in methods of handling stock, that it is quite impossible to lay down any general rules in regard to stock costs, whether it be in a job order cost system or any other sort. The best that can be done is to discuss some of the conditions encountered and suggest means to secure with them as accurate costs as possible. Any particular mill would then be able to work out a solution of its own problems by adjusting the various methods to suit particular conditions.

The first thing to consider is the accuracy with which materials are measured to the beaters. This may vary all the way from really accurate measurements by means of scale weights (where dry pulps are used) through fairly accurate measurements by means of the tank system or consistency regulators for slush pulps, down to absolutely no measurement at all wherein certain pulps are added until a certain consistence in the beaters (judged by "feel") is reached. Naturally the more accurate the measurement of the different materials the better is the start we have on the problem, and conversely, the complete lack of measurement of one or more pulps necessitates broad assumptions and indefinite results which cannot be checked with any satisfactory degree of precision. The accurate measurements leave no particular problem in this respect—the weights used are definitely known and it only remains to apply them to certain grades or orders—so we shall first discuss the most difficult case wherein there is no measurement at all.

Some Formula Necessary

In nearly every case some effort is made to make the paper according to a given specification, since it would be quite impossible to maintain the quality of any grade if this were not so. For this reason, in practically every case, instructions which may be termed the bases of formulas, are issued to the beater men specifying at least the amounts of the more expensive materials which are to be put into the beaters and leaving indefinite only the less expensive ones. Thus the instructions may call for a certain weight of sulphite pulp and will probably state the amount of filler, size and alum to be used, but leave indefinite the quantity of soda and broke. In this case the beater man is expected to use the stated quantities of sulphite, clay, size and alum and then add soda or broke, or both, until the beater is filled to capacity at a certain consistency, which latter is judged by the experience of the operator. The question then is, How can we set some values for these quantities?

Method of Total Beater Weights

In the first place we must go on the assumption that the operators do use the specified quantities of sulphite, etc., the problem being to determine those of the soda and broke. To do this we must have recourse to the supposition that a certain beater when filled to capacity in the proper manner with a furnish of a certain nature actually holds a definite total quantity of furnish. Though this assumption may be far from true, we have no choice but to ignore the fact and go on our way rejoicing. Presuming, then, that our beater, properly filled with this type of furnish, does contain a certain weight of material, and knowing the quantities of sulphite, clay, alum and size, we arrive at the quantity of soda and broke (combined) by difference. Thus, if for this type of furnish we assume that the total weight in the beater will be 2,000 lb., and the specifications call for 1,000 lb. of sulphite, 300 lb. of clay, 30 of size and 50 of alum we have accounted for 1,380 lb., which leaves 620 lb. of soda and broke. The only way in which we can get a distribution between these two is to secure some records which will show the total uses of soda and broke over long periods of time and assume that this balance is to be divided on a similar basis. Thus, if we find that over a long period of time, new soda used compared with broke made is in the proportion of four to one, we must say that of this balance one-fifth or 20 per cent is broke and four-fifths or 80 per cent is soda. We thus deduce the composition of this beater to be the following:

Sulphite	1,000 lb.	
Clay	300 lb.	
Size	30 lb.	
Alum	50 lb.	
	1,380 lb.	all measured in.
Soda 80% of balance	496 lb.	
Broke 20% of balance	124 lb.	
	2,000 lb.	

Obviously, this is not a satisfactory method so far as being able to have any real faith in the results, but under the conditions, when there are no measurements of one or more parts of the furnish, it is the best we can do, and the fault must be laid at the door of the production methods rather than of

the accounting. It is self evident (when the matter is given any consideration, which is not often!) that no system of accounts can be any better than the primary information which is received by the accounting department, and that if this is not accurate and definite, the resulting figures cannot be any better.

Sometimes a mill will be in the happy position that all the beaters are of the same, or approximately the same, size. This simplifies matters, for in that case one set of calculations may be used throughout so far as beater weights and means of securing the unknown quantities are concerned. Often, however, the problem is complicated by the fact that the equipment differs for different machines. This means that we must not only know the specified quantities of pulps, but we must have different scales wherewith to calculate the balances by calculations for each different machine. This is unfortunate but cannot be avoided.

Types of Furnish Affect Total Weights

In attempting to calculate balances by difference it will be found that different furnishes will have different total weights in the beaters. Thus a furnish having a high clay furnish will weigh more per beaterful than one with a low clay furnish. To avoid complicating matters too much it is customary to grade the different furnishes into broad groups as, for instance, those having 100 lb. or less clay, as one class with, we shall say, a total beater weight of 1,500 lb.; those of 250 lb. clay with a beater weight of 1,700 lb.; those of 500 lb. clay with a total weight of 2,000 lb., and so on, the figures given being, of course, merely illustrative. As the filler is the one factor which has the greatest effect on the beater weight it is usually the controlling factor and the groups are based upon that, other factors being disregarded.

It might be thought that a better way would be to determine beater weights with some degree of accuracy by experimentation, but this is open to question. It is doubtful whether or not under actual operating conditions any two beaters of the same formula furnished in this manner will weigh alike. Another thing is that when the experiments are being carried on, the beater men may use much more care and quite different methods of filling their beaters than when they are free from observation. The result is that the test method is quite apt to be inaccurate unless continued over a long period of time. Of course it is necessary to have some facts on which to go in setting the weights in the first place, but whether actual tests are any better than the practical experience of the operating men, or calculations of weight by engineering formulas based on the cubic capacity of the beaters, it is difficult to say. In any event under such a system some bases for beater weight must be taken for granted and, of course, the better information and the more accurately they are set the better.

Total Uses of Materials

Back of the matter of calculating the weights put into each beater there should be some means of checking the results to determine whether or not total uses over a period of time, such as a month, come within a reasonable degree of the total usages of each material as calculated to have been put into the beaters. This means that the total usages as calculated from day to day for each order or grade should be added up for the month by individual materials and then compared with the reported total uses of the materials for the same period. This is not so simple as it sounds, because it involves first, tabulating the number of beaters of each furnish used (and the various beater weights if the beaters on different machines differ) and secondly, some means of securing the total usages of the materials for the month. It is by no means infrequent to find that where slush pulps are used there is no accurate record of the total productions or amounts used. In fact it is the exception where there is any such record which can be considered at all accurate because the measurement of large quantities of slush pulp is both difficult and expensive. Where some attempt is made to measure productions the matter is simplified, but where the pulp goes directly from the digesters (through the intermediate bleaching and other operations) to the beaters without any attempt at actual measurement, the only way is either to assume a constant yield per digester or to supply the usages as calculated at the beaters for the production. As it is probably true that digester yields do vary and are not constant, this means of calculating production is very inaccurate and affords but an indifferent check on usages as reported at the beaters. Poor as it may be, however, it is the only one available and it must be used and may give some information of value, though even a wide discrepancy will not necessarily prove that the bases employed for total beater weights, and thus for calculating usages, is wrong. It is certainly a clear case of the blind leading the blind and gives an idea of some of the extreme difficulties encountered by the paper-mill cost accountant.

Considering the case of a paper-mill making its own pulp and steam it would not be at all surprising, if a real check were made of the sources of information, that as much as 60 per cent or more of the total costs that go to make up the cost of a lot of paper are pure assumptions and not based on any definite measurements at all.

When the total amounts of pulps used in all papers and in all beaters during a period such as a month is frequently an unknown quantity, it is not surprising that the amounts which go into any particular order or grade should be largely a matter of "guess-

timate." The only thing that can be done is to adopt some method which appears to be reasonable and then be as consistent as possible in its application. The means outlined herein of calculating usages by means of total beater weights is about as good as can be secured where the actual measurements are lacking. We can but use such information as we have and adapt it to our particular conditions, always sticking to known facts as closely as possible and avoiding going afield from known facts any more than is absolutely necessary.

The next step will be to attempt some sort of a tie-up between the furnish added to the beaters and the rough paper off the dry end of the machine, which will be the subject of discussion in the succeeding article of the series.

Technical Advances in the Swedish Pulp Industry

Part IV[1]—Modifications Undergone by Fibers in Cooking and Processing of Pulp—Advantages of Indirect Heating and Forced Circulation—The Resin Nuisance in Unbleached Sulphite.

By GÖSTA HALL
Svartvik, Sweden

IT is known that the average length of the original cellulose fibers of the wood becomes modified during the processes of manufacturing and washing to which the wood and the pulp are subjected in the pulp mills.

Spruce wood is composed originally of a mixture of long, strong fibers, of tracheids which constitute the body of the tree, and of small fibers, the medullary ray cells, which are placed transversally and serve as canals for conducting nutrient solutions to the tree. (See Figs. 12 and 13).

Every Tenth Fiber Shortened in Chipping

It should be noted in the first place that, normally in the manufacture of pulp, every tenth long fiber is cut or shortened when the logs are chipped in the chipper. In addition, a considerable number are shortened in the mechanical treatment to which the pulp is subjected in the operations of cooking and washing. This lowering of the average length of the fiber is offset to some extent by the fact that a portion of the smaller medullary ray cells may be eliminated in the thickening processes connected with the different stages of stuff preparation.

In Table I are shown the results of a series of fiber measurements performed on intact spruce wood with a view of studying the proportionality of fibers in the wood in its original condition.

Collecting the Fibers

The collection of fibers on which this study is based was made by taking a number of chips which had retained their form after cooking and the digester blow, and dissecting them gently to recover the inner central part. The length of the individual fibers, liberated by shaking with water in a test tube, were determined according to a method practiced at the Central Laboratory of Finland. This method makes direct measurements of projected preparations by means of a skiopticon, associated with a microscopical examination.[2]

TABLE I
Fiber Composition of Spruce Wood and Comparative Lengths of Fibers

Intervals of Length in Mm.	Fiber Distribution % of Number		% of Length	
	Absolute	Disregarding fibers less than 0.5 Mm.	Absolute	Disregarding fibers less than 0.5 Mm.
0–0.5	83.3	–	18.5	–
0.5–1.0	1.5	9.1	1.0	1.3
1.0–1.5	0	0	0	0
1.5–2.0	0.1	0.8	0.3	0.2
2.0–2.5	0	0	0	0
2.5–3.0	1.3	7.6	4.1	5.0
3.0–3.5	0.9	5.3	3.4	4.2
3.5–4.0	1.1	6.8	5.1	6.3
4.0–4.5	2.4	14.4	12.3	15.7
4.5–5.0	5.7	34.1	32.4	39.8
5.0–5.5	3.7	21.9	22.9	28.0
	100.0	100.0	100.0	100.0

Average fiber length, absolute.....0.83 mm.
Average fiber length, fibers under 0.5 mm. disregarded.....4.05 mm.

The table (Table I) shows that the number of fibers shorter than 0.5 mm., that is to say, of medullary ray cells, exceeded 80 per cent of the total number, and their total length not less than 18.5 per cent of all of the fibers and fiber fragments. By weight this is merely one-third, because of their thin and hollow structure. Fig. 13 gives a good idea of the relative proportions of the two types of fiber.

Disregarding then, the medullary rays, the measurements indicated a mean fiber length of more than 4 mm. for spruce fibers. Inclusive of these fibers, the average length of the pieces was but 0.8 mm.

Experiments at the Central Laboratory of Finland have shown that ordinary unbleached sulphite pulp contains between 60 and 65 per cent of fiber fragments shorter than 0.5 mm., the average length appearing to vary between 0.75 and 0.90 mm. The corresponding figures for sulphate pulp are slightly better; i.e., 50 to 55 per cent of fiber fragments shorter than 0.5 mm., and an average length of 0.95 to about 1.15 mm.

[1]Parts I, II and III will be found in THE PAPER INDUSTRY for October, November and December, 1930.

[2]A description of this method appeared in Papier-Fabrikant, Heft 29, 1929.

Comparison of Pulps Produced by Forced Circulation and the Ordinary Way

In order to determine the relation of two sulphite pulps, one cooked by forced circulation and the other by the old method of cooking, an examination

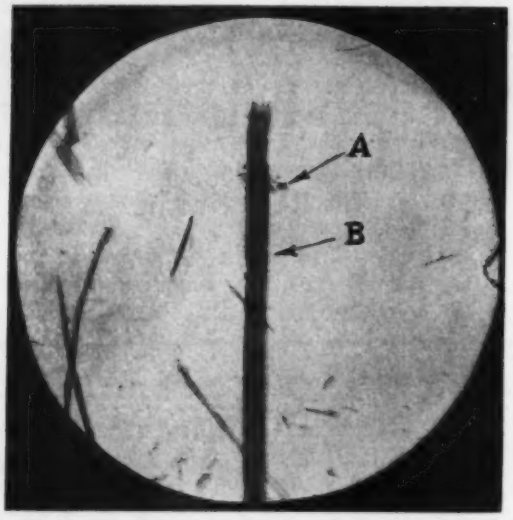


Fig. 12—Photomicrograph of a bundle of spruce fibers cooked with sulphite. (A) Medullary ray cells; (B) Canals

was made of the pulps produced by the two cooks. The two pulps were made from the same wood, with the same acid composition and period of cooking. The temperature was, however, much lower in cooking with forced circulation than with the other, 126 deg. Cent. (259 deg. Fahr.) and 131 deg. Cent. (268 deg. Fahr.) respectively. The measurements were made in conformity with the above method of the Central Laboratory of Finland on representative samples of pulp after high power pressing and drying on the machine.

The results of this investigation are set forth in Tables II and III. The distribution of the fibers between their different intervals of length is favorable in all cases. The percentage of inferior fibers shorter than 0.5 mm., is 42.3 to 40.8 respectively, while the average length of the fibers show an increase of 1.18 to 1.25 mm.

In comparing the two pulps, the one cooked by forced circulation and the other by the ordinary system, it is evident that the former has an average length of fiber 7 per cent greater than the latter, inclusive of little bits of fiber, shorter than 0.5 mm., and 13 to 14 per cent greater if these fragments are left out of account.

The higher average length of the fibers of pulp cooked by indirect heat explains how a perfectly homogeneous pulp has a greater resistance to mechanical wear in defibering and washing processes in a pulp mill than a mixture of irregularly cooked fibers.

TABLE II

Fiber Lengths of Strong Spruce Sulphite, Cooked with Indirect Heat by Steam Spirals (Relative Bleach Requirement 49%)[3]

Intervals of Length in Mm.	Fiber Distribution	
	% of Number	% of Length
0- -0.5	42.3	8.1
0.5- -1.0	13.2	7.4
1.0- -1.5	10.3	10.7
1.5- -2.0	10.8	15.4
2.0- -2.5	9.6	16.2
2.5- -3.0	6.5	15.0
3.0- -3.5	3.9	10.6
3.5- -4.0	3.2	10.1
4.0- -4.5	1.0	3.7
4.5- -5.0	0.2	0.8
	100.0	100.0

Average fiber length, absolute.....1.18 mm.
Average fiber length, fibers under 0.5 mm. disregarded....1.88 mm.

TABLE III

Fiber Lengths of Strong Spruce Sulphite, Cooked with Indirect Heat from Pre-Heater and Forced Circulation (Relative Bleach Requirement 49%)[3]

Intervals of Length in Mm.	Fiber Distribution	
	% of Number	% of Length
0- -0.5	40.8	8.7
0.5- -1.0	11.4	7.2
1.0- -1.5	11.4	10.9
1.5- -2.0	9.8	13.1
2.0- -2.5	7.5	12.9
2.5- -3.0	7.7	16.9
3.0- -3.5	5.6	14.4
3.5- -4.0	3.8	11.1
4.0- -4.5	1.8	6.1
4.5- -5.0	0.2	0.7
	100.0	100.0

Average fiber length, absolute.....1.26 mm.
Average fiber length, fibers under 0.5 mm. disregarded.....2.14 mm.

[3]Corresponding to 0.55 × 49% = 26.9% bleach powder.

The Resin in Sulphite Pulp

In connection with the character of the cells of wood which we have been discussing, I desire in passing to touch on a question which sometimes leads to differences of opinion between buyers and

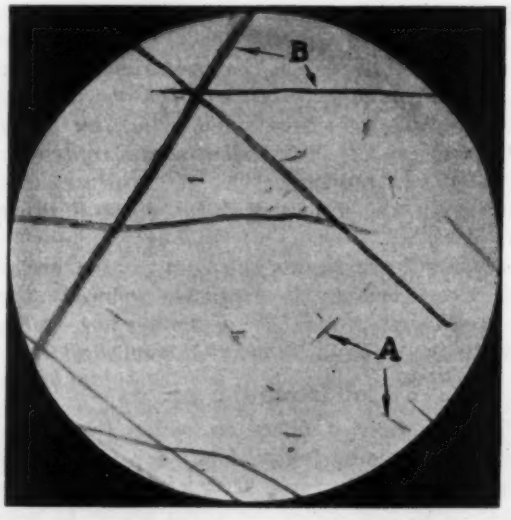


Fig. 13—Sulphite cooked spruce wood after defibration. (A) Medullary rays; (B) Tracheids

sellers of unbleached sulphite pulp, and that is the question of the "resin nuisance."

Spruce wood contains small amounts of resin which are not chemically acted upon by the cooking

acid in the sulphite process and which will be found again in the finished pulp. Ether extraction of an unbleached pulp will show a resin content of usually 1.50 per cent (maximum) of the weight.

Use of a Selective Stain

There is a special dyestuff called Sudan III which stains the resin without tinting the fibers. By the aid of this method of staining, introduced by Klemm, I have made a microscopical study as to the manner of appearance of resin in the wood and in the pulp, being led to do so because of the behavior of the resin in the various mechanical treatments necessary in the conversion of pulp into paper. Result: practically all of the resin is found concentrated in the medullary ray cells, in the pulp as well as in the wood. The resin content seems to be ordinarily not less than 10 per cent.

Owing to the weak structure and thin walls of the medullary ray cells the resin is easily squeezed out, and in such a case it will adhere as small globules readily agglomerating as larger clusters upon the tracheids.

Beating the pulp in a beating engine leaves the resin very nearly intact in the cells, while any method of triturating the half-dry pulp as, for example, by grinding in an edge mill or kollergang, al-

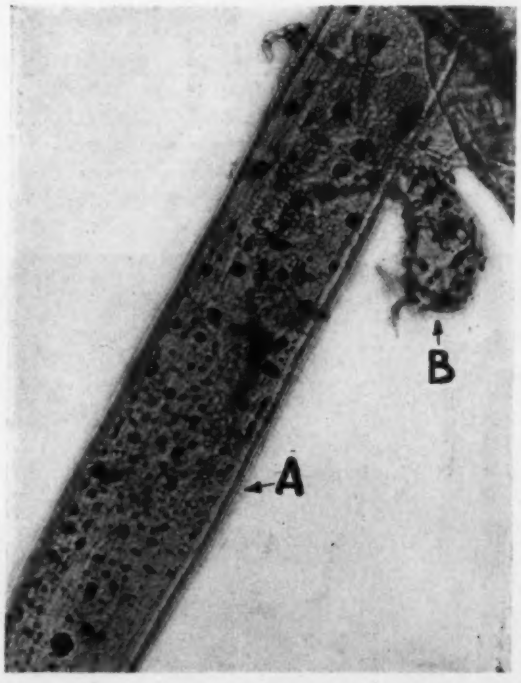


Fig. 14a—Appearance of resin in strong sulphite pulp which has been treated in a Kollergang. This is the same pulp as is shown in Fig. 14. (A) Canals; (B) Medullary rays

most inevitably results in the resin being squeezed out. Since unbleached sulphite pulp is frequently subject to defibration in a kollergang in paper mills, it would be well to discourage this method, at least when the sulphite pulp is strong-fibered and requires a long time for defibration. (The author refers to European practice—Ed.)

Figures 14 and 14a sketches the manner in which the pressure of a kollergang squeezes out the resin. If the treatment of the pulp in a kollergang is persisted in (Fig. 14a), the small globules of resin form

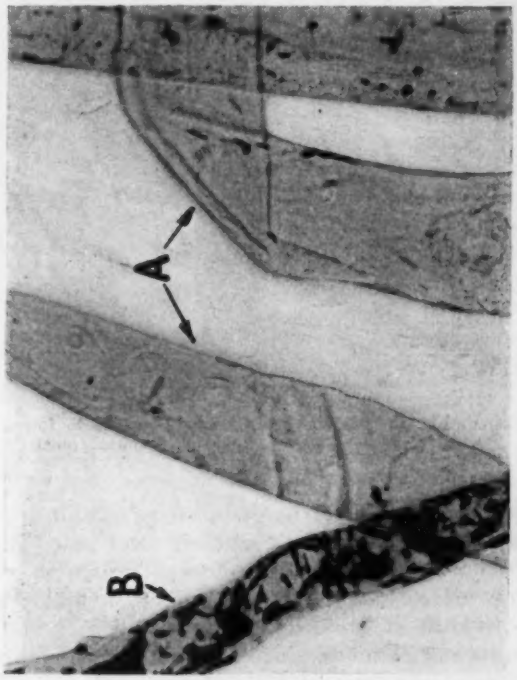


Fig. 14—Resin in a strong sulphite pulp, tinted with Soudan III. (A) Canals; (B) Medullary rays

themselves gradually into aggregates which grow more and more and end in deposits in the kollergangs or in the beaters. The defibration of sulphate

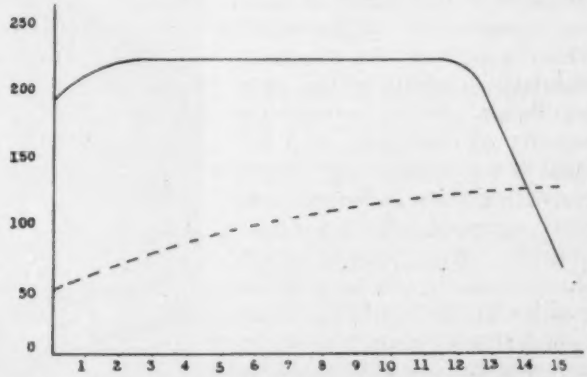


Fig. 15—Cooking time. This shows the change of rapidity of circulation during the cooking of strong sulphite pulp by means of forced circulation. Straight line is velocity of cooking liquor and the dotted line temperature

pulp in kollergangs is not so objectionable as in the case of unbleached sulphite pulp.

Mr. Hall summarized the advantages of the new system of using forced circulation in the cooking of

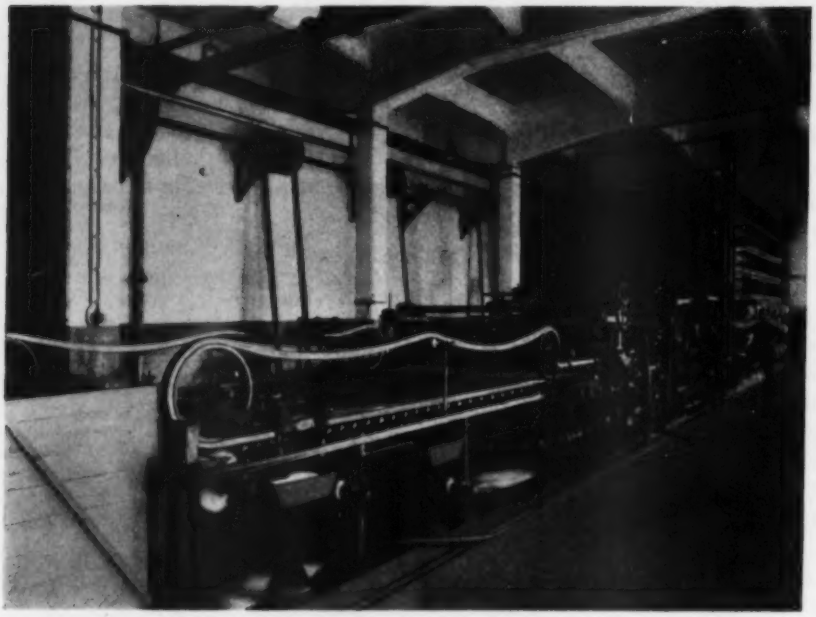


Fig. 16—Machine for the drying of pulp by hot air. The dryer part is visible in the background

sulphite pulp, which, he said, were not limited to obtaining a more uniform and stronger pulp. There were improved possibilities for retaining an even degree of cooking from one cook to another, and the progress of the cook can be readily followed by blowing out samples, since the samples so obtained are entirely representative of the entire digester contents.

However, it does not seem necessary to make use of these means of control, which are more or less complicated and time consuming, because we have an almost ideal indicator of the degree of cooking presented unexpectedly, which is to know **the change of circulation rapidity of the cooking liquor.** We may read the rapidity of circulation in a moment if we connect the apparatus with a throttle flange (Venturi) equipped with a pressure indicator. The evidence of this shows that the rapidity of circulation at the beginning of the cook increases slightly as a consequence perhaps of reduced viscosity during heating. As soon as lignin separation starts, the viscosity increases and it would seem as though this rise would balance the subsequent lowering, thus regulating the rapidity of circulation.

When the cooking period reaches that phase where the wood begins to soften, settling of the wood in the digester undoubtedly takes place; this increases resistance in the screen, which is at once noticeable by a change of circulation rapidity and the more the delignification proceeds, the greater is the probability of plugging up the screen, which in turn results in a greater lowering of the rapidity of circulation. This automatic method of controlling the progress of a cook seems to be superior to any method so far used in the manufacture of unbleached sulphite pulp for determining the end of a cook.

The accompanying diagram (Fig. 15) gives an idea of the approximate changes in rapidity of circulation during the cook. Note the abrupt decline in the curve when the end stage of the cook approaches. If cooking is always interrupted when rapidity of circulation has reached a predetermined low level, it will result in the production of pulps practically alike from cook to cook.

This new method of cooking has an additional advantage which is that the pulp is always clean.

As previously stated, the use of indirect heat is best when working with strong sulphite pulp. This is accomplished usually by leading steam through copper coils into the lower part of the digester. As

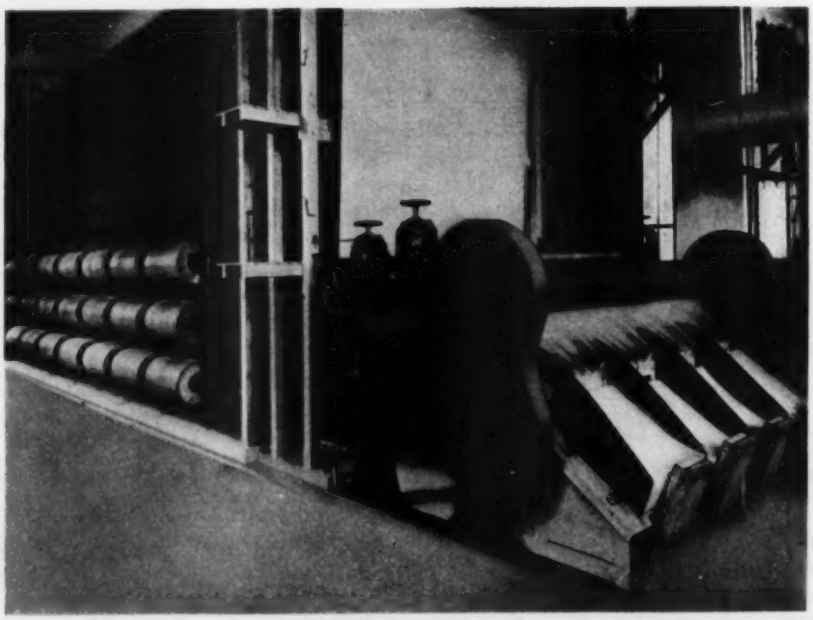


Fig. 17—Dryer part of the machine for drying pulp by means of hot air

a consequence of poor circulation of the cooking liquor, a certain amount of local overheating is unavoidable and causes trouble. There is always some gypsum in the sulphite acid, which deposits as hard crusts in the copper coil, and in addition to this there is often blackening from admixture with burnt fibers. If the crusts become thickened they loosen and are carried into the pulp when blowing the digester. The frequently noticed black granules in strong sulphite pulp come from such crusts, which crumble up during defibration. This trouble is avoided by the new method.

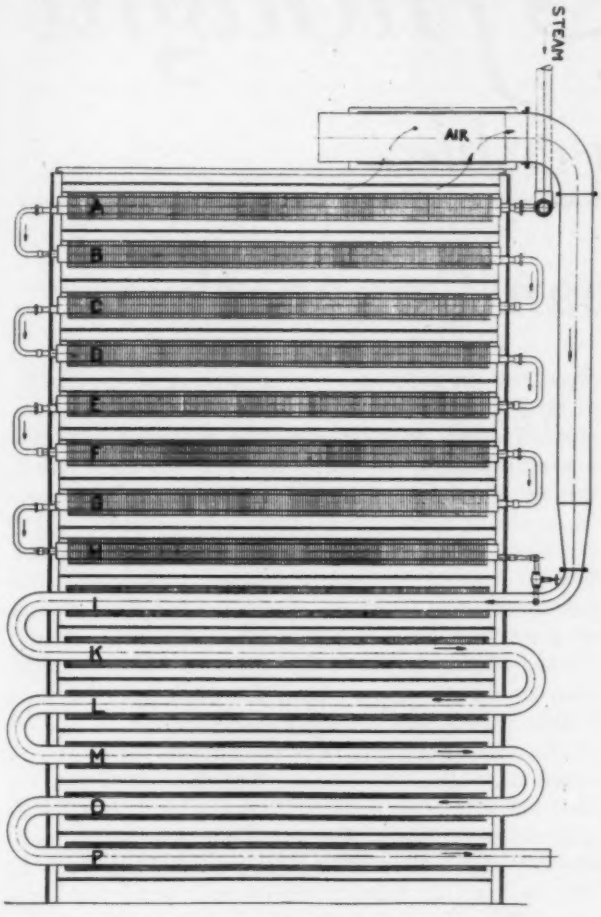


Fig. 18—Cross section of the dry end of the machine

Drying Pulp by Means of Hot Air

Up to the present time pulp for export has been dried on steam-heated cylinders much in the same way as paper is dried in paper mills, the only differences being that felts are not used and the pulp dryers are equipped with high pressure presses, and no shake is imparted to the wire part.

This method of drying pulp, which has to be again brought to a moist state before being made into paper, is by no means a rational one. The strong pressure employed in dewatering the pulp renders the subsequent separation of the fibers a matter of difficulty and the capacity of the fibers to swell in beating is probably diminished by the great heat to which they are exposed on the drying cylinders.

Since wet pulp is not conveniently transported, efforts were made to discover a better method of drying which would be capable of turning out a pulp easier to defiber or disintegrate and one better adapted to preserve the properties of the pulp intact. The American system called "Fidalgo" represents a step in the right direction. Here the pulp is mechanically shredded into tufts or thin wafers which are dried by means of hot air, but this system of drying is not so suitable for pulp intended for exporting, because of the frequent exposures to which the pulp is subjected in transshipment from pulp

(Continued on page 2036)

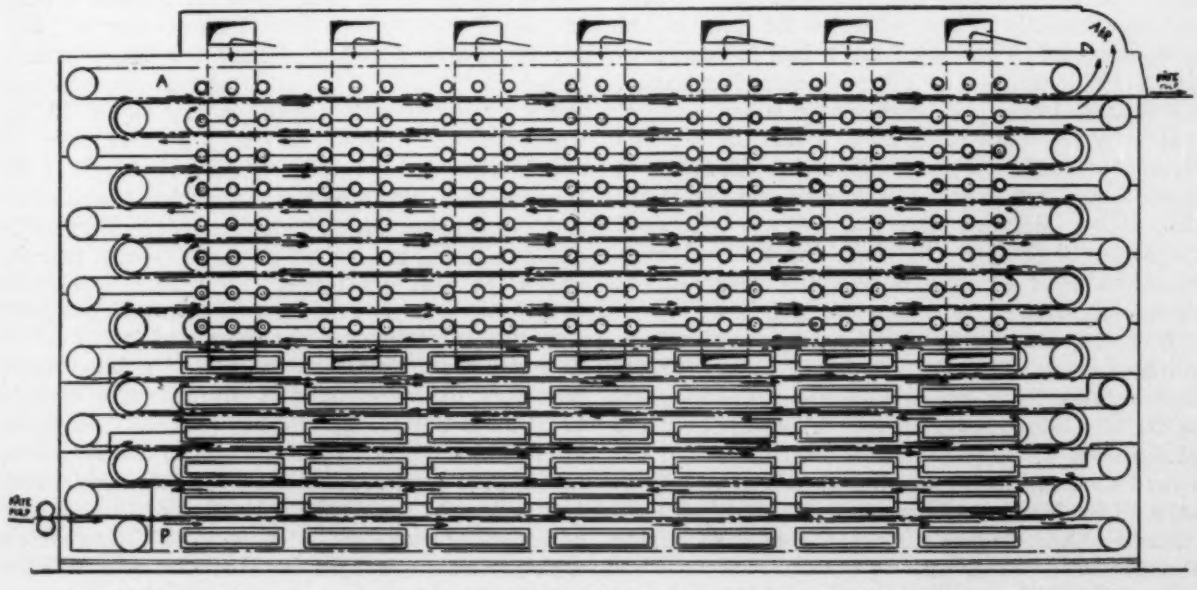


Fig. 19—Diagramatic cross section of the drying machine showing the direction of pulp through the wet and dry parts

Current Thought by William Sibley

This Un-American Generation

THERE is something the matter with the present generation of Americans. We are not the same as we used to be. So far removed are we from the accepted thought and ideals of yesteryear that, if our forebearers were American, we are un-American. Whether the change be for better or worse is not the point of this paragraph. The fact remains, in the light of yesterday's ideals and adherences, we are un-American.

One of the most devastating droughts ever experienced over a wide area in the United States was during the year 1881. While our president lay suffering with the heat, an assassin's bullet in his body, corn, potatoes, gardens, pasture, hay (then the most valuable of crops) burnt up. The Ohio River all but dried up under the blazing sun; it being quite easily waded at several points. All river transportation ceased. Starvation stalked across the hills and prairies, taking up residence in hundreds of homes. But nobody dreamed of such a thing as governmental aid for the sufferers. Indeed, the self-reliance and independence of the people would have united in resentment to any such move had it been suggested. Our people had not yet learned to expect Washington to pay for their private losses.

Exactly the same thing may be said for the sufferers from the repeated starvation droughts in Texas, Oklahoma, Kansas, Nebraska and the Dakotas. Or the stalwart folks who met and conquered the locust blight. Or the folks who suffered enormous financial reverses during the readjustment period immediately following the Civil War.

Now it seems, we are a different race of people. All goes along swimmingly until, by force of world circumstances, our mass-production brand of prosperity hits a temporary slump. Then, under stress of financial losses, diminished production and enlarged unemployment, we find ourselves willing to turn to our Federal Government for **demanded** assistance. And this, to remedy ills we have largely brought upon ourselves.

Prosperity has generated soft thinking. Instead of pulling our belts up a notch, spitting on our hands, gritting our teeth, and going at our jobs with increased effort to overcome the obstacles of temporary difficulty, we spend most of our time either talking about how severe this temporary depression is, or asking synthetic aid from a government which owes us nothing but in reality to which we are heavily owing. Instead of helping ourselves as did our forebearers (and we are infinitely better situated than they, with our Red Cross, Salvation Army, United Charities, etc.), we take this one-year occasion to involve the Federal Government in things which are entirely beyond its province.

Material prosperity has led to soft thinking, it requiring only 12 months of hard times to bring out that characteristic—the evidence being the distressing and costly legislative manifestations at our Capitol. Twenty million dollars (of a $69,000,000 "relief" bill) going for food, clothing and other personal needs of people who have always been "poor" and who are no worse off today than the Indiana or Ohio farmer of 1881, or the Iowa homesteader of 1875. . . . .Nearly a billion dollars for false, utterly fallacious "relief" to a bunch of soldiers, the majority of whom will themselves pay $2 for $1 for what temporary relief they may gain from a so-called "loan." . . . .The imminent passage of the Wagner bill, said to be the means for "stabilizing" employment, but which under stress of emergencies can do nothing more than give alibis,—and thereby afford the next generation full expectancy of jobs at the hands of the Government; and if not jobs, then certainly unemployment wages (doles). . . . . The still more imminent passage of a bill to affix a 10c tax to every pound of oleomargarine sold in the United States—a malicious piece of class legislation which will do far more harm to the margarine eaters than good for the dairy interests, and which in itself is the practical confiscation of the business of several corporations,—"confiscation" being merely a polysyllabic synonym for **theft.**

It is soft thinking on the part of all of us—or we

would never permit our legislators to continue the present trend of degeneration from a republic to a bureaucracy. Since we elect them, it is our fault that our pseudo-statesmen are permitted, even encouraged, to spend over $13,000,000,000 a year in the management of this country—to pile bureau upon bureau and commission upon commission until we are overrun with regulators, investigators, inspectors and prosecutors. It is the fault of our soft thinking that we permit new crimes constantly to be committed in the form of needless and malicious statutes; or, as a single instance, our railroad taxes to be increased 1,220 per cent while our railroad property investment has increased only 200 per cent, and our railroad business only 500 per cent. If there be harm in leaning on Washington for everything;—in bringing ourselves to a point where we believe that all things are lawful which are not already prohibited by statute, that harm must be charged to our habits of soft thinking,—entirely un-American, as we might rightfully think of the term.

Government Doles on the Way

What are we going to do about it—? Probably nothing. Only in very rare instances do we see things until it is too late. As every war has found us unprepared, so did American Business fail to awaken to the peril of unsound soldier bonus legislation until a prominent speaker exposed its likelihood at a New York City club—48 hours before the bill was passed by the House. Many and varied have been the warnings issued to the effect that our whole governmental structure is drifting toward the sea of socialism, but I venture the assertion that no concerted effort will be made to stem the tide of doles (just one of the concomitants) until such effort becomes worse than futile because of its tardiness.

And so, probably nothing will be done about it. Out of consideration for this high probability, let us review briefly the visible results of dole legislation in other countries. We may at least see plainly what we are letting ourselves in for—since as surely as the sun will rise tomorrow, permanent doles of one kind or another are just around the corner. Soft thinking has permitted a generation of continuous grab to have begun. Merely because I was of the right age and wore a soldier's uniform for upwards of two years I am going to receive money at the hands of the United States Treasury which I never expected and don't deserve. Merely because some men and women have made financial failures of their lives and have arrived at the proper age,—they will presently be the recipients of government cash (in old age doles)—which they never earned and don't deserve. Merely because some worker is laid off by reason of the unalterable law of supply and demand for his services, that laborer will presently be able to apply for an unemployment dole—and get it—although such payment is sheer confiscation of public funds, and as previously remarked, confiscation is merely a polysyllabic term for theft.

These social developments are on the way. They are not far off. Probably nothing will be done about their encroachment. So let us survey, ever so briefly, the experiences of other governments with similar developments.

In England

Harry English, 38, married, with four children, may be a bricklayer for a contracting firm in Liverpool, a machinist in Manchester, a loom-tender in Leicester, or a taxi-driver in London. Every week he contributes 14 cents to the National Unemployment Insurance Fund; his employer 16 cents; the State 15 cents. Should Harry's employer retrench or shut down, Harry may present his record book to the local employment office and enter a claim for payment of benefits. To gain this, Harry must show that he has made at least 30 payments in the last two years; that he has continuously been unemployed since the layoff, and that he is capable and available for work. The benefit may be denied him if he has refused a suitable job offered by the labor exchange; lost his job through strike or lock-out; disobeyed the rules of the labor exchange; or has been in jail. He may be disqualified for benefits if he has lost his job through his own misconduct, or if he quit voluntarily.

In any event, Harry receives no benefit for a period of six days, known as the "waiting period." Thereafter, he will receive weekly $8.13 for his wife and children, and a further benefit of $3.17, making a total of $11.30. The rates for boys and girls are proportionately smaller.

When this dole law was enacted in 1911, Harry's benefit was limited to a maximum of 15 weeks. Now he can receive the dole indefinitely, so long as he can show proof of unemployment plus availability for work. Regardless of his trade, Harry makes the same contribution and receives the same benefit, there being no differentiation as to skill, occupation, earning capacity or industry involved. The only classification is by age and sex. This naturally compels prosperous industries such as printing, public utilities, or distributive agencies to bolster seasonal or sick industries such as mining, textile, shipping or shipbuilding.

Back in 1911 it was said, and believed, that the law would result in a self-sustaining fund, actuarially sound, and that later separate accounting could be made by industries on the basis of risk. But with the advent of more and more radical cabinets, plus the War, the original law was enlarged greatly; the benefits being "extended," first to care for this class, later to meet the "rights" of another class, etc., etc. With the result, naturally, that since 1925 the deficit has risen steadily,—and rapidly. Today the debt

is $272,160,000; while the annual cost is $520,000,000, or nearly four times as much as England's annual war debt payment to the United States. Of this sum, employees pay about $69,000,000, employers pay about $77,000,000 and the balance of nearly $375,000,000 is derived from taxation. Incidentally, more than one-fifth of the total cost goes for "transitional benefits," or relief to those not qualified under the law. These conditions, and the rapidly mounting deficit, is causing serious apprehension among sober-minded people in England, since it is now recognized that the dole legislation was a step in the direction of industrial socialization and prosperity stullification.

In Germany

George Germany receives his unemployment benefits under the German law in very much the same manner as Harry English. There are variations to be found in the set-up and operation of the law, but in the main it is closely similar. One of the more outstanding differences between Germany and England is that George Germany can receive his unemployment benefits for a period of 26 weeks; or for 39 weeks "if the economic situation is critical."

Dole legislation for the unemployed in Germany dates from 1927. Prior to that time, relief had been available only from public funds. The unemployment dole fund is made up by equal contributions from the employee and the employer based on percentage of the pay-roll. Up to the first of 1930, this was 1.5 per cent, but since then, due to the rapidly mounting deficit, this percentage has skyrocketed to 3.25 per cent, with every indication of going higher next fall.

Thus in Germany as in England (and indeed in any country supporting such laws) the deficits always incurred after a year or two of operation is the point of worry among people interested in self-preservation. During 1929 the cost of this law, in Germany, was $376,000,000; about two-thirds of which sum was paid by the employers and employees, the remaining third being paid by credits voted by the Reichstag. The necessary credit voted in 1929 (and the 1930 credits will be much higher) was more than one-fourth as much as the annuity due under the Young plan.

If we were of the same mental caliber as our forebearers, an expose of the costs of such legislation as this would give rise to concerted opposition and extreme resentment at its suggestion. Because the golf club has replaced the axe and the microphone the debating rostrum, however,—there doubtless will be nothing done to stem the tide which is rising. Anyone who has followed my writings will know that I hold no brief for the axe or the lower social standards that axe implies. I wish for no return to "the good old days." I merely deplore the paradoxical concomitant of prosperity and higher living standards, which is—soft thinking.

Technical Advances

(Continued from page 2033)

mill to paper mill and it does not appear to have any advantage over cylinder dryers as regards heat economy.

In the saw mills of the Korsnäs Sagverks Aktiebolag, at Gefle, a new method of drying wood has been in use for several years. It is a system which makes for heat economies and it was decided to apply the same principle to the drying of pulp, and a machine was accordingly built in the Korsnäs pulp mill.

The pulp is dried by means of hot air maintained at a comparatively low temperature, about 90 deg. C. (194 deg. Fahr.), which at the same time an effective recovery of the heat of vaporization of the water forced out of the pulp.

Figs. 16 and 17 are from photographs of the new drying machine, the exterior of which resembles a large box. The machine is 2,400 mm. (approx. 8 ft.) wide.

The drying part is divided into fourteen horizontal sections (A-P), each having an endless chain carrier and a heating battery. The chain carriers travel in opposite directions in each second part, the pulp coming from the wet presses being led in zig-zag fashion through these sections, from the lowermost (P) to the uppermost (A), as shown in Fig. 19. Through a ventilator a current of air is blown into the lowermost section (P). The air leaves the uppermost section (A) in a heated state and saturated with moisture. The heat batteries in the eight upper sections (A-H), coupled in series, are fed with live steam, while the six lower batteries (I-P) receive the warm moisture-saturated air which passes from the drying machine with the pulp. This air is taken from the uppermost part of the drying section and suctioned into the lower batteries, also coupled together. The lower sections thus become a preheater for the pulp as well as a heat generator for the drying air. The new machine is being tried out for the drying of lapped wood pulp.

Comparisons show that only half the time was required in a beater to completely defiber a strong sulphite pulp which had been dried by hot air in the new machine. The result indicated not only economy in power, but increased production capacity and indirectly a favorable influence in regard to the strength of the finished paper.

Your present job is your best opportunity. Your failure depends on how you do your present work. If you do it carelessly or even mechanically, you will never get ahead. If, however, you will put energy into it, try to produce more than the other fellow in the plant, and give the company a new idea once in a while, your present job will soon be a stepping stone to a better job.—Roger W. Babson. (In Brown Bulletin)

The Paper Industry '31 Safety Contest

First Reports Show 61 Perfect Scores and 12 New Mills Entered in Contest

PERFECT SCORES—JANUARY
Division I—Paper and Pulp Mills

	ENTRANT	MILL
Group A	Spruce Falls Power & Paper Company, Ltd.	Kapuskasing
	Kimberly-Clark Corporation	Falls
	Kimberly-Clark Corporation	Kimberly
	Bird & Son, Inc.	East Walpole
Group B	Nekoosa Edwards Paper Company	Port Edwards
	The Champion Coated Paper Company	Paper No. 1
	The Mead Corporation	Kingsport
	Marathon Paper Mills Company	Menasha
	Kimberly-Clark Corporation	Niagara
	Canada Power & Paper Corporation	Anglo-Canadian
	Container Corporation of America	Ogden
	Continental Paper & Bag Corporation	Rumford
Group C	Dells Paper & Pulp Company	Eau Claire
	Cornell Wood Products Company	Cornell
	Escanaba Paper Company	Escanaba
	*Jno. H. Heald Company	Lynchburg
	International Paper Company	Piercefield
	Finch Pruyn & Co., Inc.	Glens Falls
	Container Corporation of America	Coated Board
	Strathmore Paper Company	West Springfield
	*Pioneer Paper Company	Los Angeles
	Hoberg Paper & Fibre Company	Fibre Div. "B"
	The Crystal Tissue Company	Middletown
	Strathmore Paper Company	Woronoco
	Port Huron Sulphite & Paper Company	Sulphite No. 1
	Price Brothers & Company, Ltd.	Jonquiere Pulp Co.
	Consolidated Power & Paper Company	Appleton
	Marinette & Menominee Paper Company	Park & Victory
	*Bedford Pulp & Paper Company	Big Island
	Hollingsworth & Whitney Company	Gardner
	Container Corporation of America	Circleville
	The Upson Company	Lockport
	Hollingsworth & Vose Company	West Groton
	Bird & Son, Inc.	Phillipsdale
	United States Envelope Company	Morgan Paper Co.
	United States Gypsum Company	Gypsum
	United States Gypsum Company	Oakfield
Group D	The Gardner & Harvey Company	Plant No. 2
	Continental Paper & Bag Corporation	Ashland
	International Paper Company	Livermore
	Hollingsworth & Whitney Company	Madison
	Wardlow Thomas Paper Company	Middletown
	The Gardner & Harvey Company	Plant No. 3
	International Paper Company	Riley
	United States Gypsum Company	North Kansas City
	Container Corporation of America	Dixon
	*Defiance Paper Company	No. 3

Division II—Remanufacturing

The Champion Coated Paper Company	Coating
Kimberly-Clark Corporation	Neenah
Container Corporation of America	35th Street
The Mengel Company	Fibre Container
Canadian International Paper Company	Fibre Board
Bird & Son, Inc.	Norwood Roofing
Container Corporation of America	Charleston
Consolidated Water Power & Paper Company	Stevens Point
Container Corporation of America	Cleveland
Container Corporation of America	Gibraltar
Kimberly-Clark Corporation	Atlas
Container Corporation of America	Natick
Container Corporation of America	Fairmont
*Bemis Brothers Bag Company	East Pepperell

IMPERFECT SCORES
Division I

ENTRANT	MILL	Rank	Points Credit	Points Debit
Group-A				
Hollingsworth & Whitney Co.	Waterville	5	826.352	
The Mead Corp.	Chillicothe	6	655.312	
Canadian International Paper Co.	Three Rivers	7	370.704	
Canadian International Paper Co.	Gatineau	8	367.280	
Canada Power & Paper Corp.	Wayagamack	9	247.392	
Oxford Paper Co.	Rumford	10	189.136	
The Ohio Boxboard Co.	Rittman	11	24.520	
Powell River Company, Ltd.	Powell River	12		216.880
*The Northwest Paper Co.	Cloquet	13		1040.912
Group-B				
International Paper Co.	Hudson River	9	771.360	
The Champion Coated Paper Co.	No. 2	10	748.320	
Canada Power & Paper Corp.	Belgo	11	718.800	
Price Bros. & Co., Ltd.	Kenogami	12	699.312	
Fraser Co., Ltd.	Madawaska	13	637.584	
St. Croix Paper Co.	Riley	14	615.344	
Canada Power & Paper Corp.	Laurentide	15	613.664	
Nekoosa Edwards Paper Co.	Nekoosa	16	604.224	
International Paper Co.	Niagara Falls	17	604.064	
Container Corp. of America	Manayunk	18	563.008	
International Paper Co.	Fort Edwards	19	534.848	
Northern Paper Mills	Green Bay	20	504.032	
Bryant Paper Co.	Paper Divisions	21	363.904	
The Brown Paper Mill Co., Inc.	Monroe	22	337.376	
Consolidated Water Power & Paper Co.	Wisconsin Rapids	23	303.648	
International Paper Co.	Otis	24	291.600	
Dill & Collins Co.	Delaware	25	72.656	
Price Brothers & Co., Ltd.	Donnacona	26		40.880
Marathon Paper Mills Co.	Rothschild	27		313.440
Price Bros. & Co., Ltd.	Riverhead	28		393.840
Group-C				
Rhinelander Paper Co.	Rhinelander	26	609.968	
Hoberg Paper & Fibre Co.	Hoberg Div. "A"	27	527.920	
*Detroit Sulphite Pulp & Paper Co.	Delray	28	487.968	
The Gardner & Harvey Co.	Plant No. 1	29	455.400	
Hummel Ross Fibre Co.	Hopewell	30	348.240	
Container Corp. of America	Cincinnati	31	298.448	
Consolidated Water Power & Paper Co.	Biron	32	265.984	
*Ticonderoga Pulp & Paper Co.	Paper Mill	33	247.520	
Tonawanda Paper Co.	No. Tonawanda	34	90.640	
Ontonagon Fibre Co.	Ontonagon	35	70.944	
Low Paper Co.	Ridgefield	36		123.840
International Paper Co.	Webster	37		211.952
Bemis Bros. Bag Co.	Peoria	38		315.866
Marathon Paper Mills Co.	Ashland	39		323.488
The Albemarle Paper Mfg. Co.	Richmond	40		368.400
Southern Kraft Corp.	Camden	41		369.952
Rising Paper Co.	Housatonic	42		371.184
Fibreboard Products, Inc.	Sumner No. 5	43		378.352
Kimberly-Clark Corp.	Lakeview	44		600.960
Alton Box Board & Paper Co.	Alton	45		875.808
*Ticonderoga Pulp & Paper Co.	Pulp Mill	46		894.560
Maine Seaboard Paper Co.	Bucksport	47		1026.608
The Adams Bag Co.	Chagrin Falls	48		1523.672
*The Northwest Paper Co.	Frederick	49		1526.128
Blandin Paper Co.	Grand Rapids	50		1635.680
Hollingsworth & Vose Co.	East Walpole	51		1672.016
*Defiance Paper Co.	No. 1	52		2302.624
Group-D				
*Detroit Sulphite & Paper Co.	Sulphite	11		1662.650

Division II

Bryant Paper Co.	Imperial	15	467.280	
The Gardner & Harvey Co.	Plant No. 4	16		9.328
Container Corp. of America	Sefton	17		2839.952
Bird & Son., Inc.	Chicago Roofing Plants	18		7369.120

Report not received: Div. I, Group B, Canada Power & Paper Corp., St. Maurice
Div. I, Group C, Canada Power & Paper Corp., Port Alfred and Port Huron Sulphite & Paper Co., Paper No. 2

(*) Mills that have entered Contest since list was published in February issue.

Large Attendance at Midwest Safety Conference

Over fourteen hundred delegates from Illinois, Wisconsin, Indiana, Michigan, and Minnesota attended the sessions of the Ninth Annual Midwest Safety Conference which was held under the auspices of the Chicago Safety Council[2] at the Stevens Hotel, Chicago, on Wednesday and Thursday, March 4th and 5th. In addition to a general session, the program was also devoted to the problems of various lines of industry. Among the sessions included were Metals and Metal Working, Public Utilities and Transportation, Petroleum, Chemicals and Rubber, Street and Highway Traffic, and Lumber Manufacturing and Construction.

The two-day conference climaxed with a banquet attended by eight hundred persons at which time G. E. Cress, Sheriff of Cerro Gordo County, Iowa, gave an inspiring address on "Human Safety—A National Problem." Handsome plaques were presented to the winners in the six months Interplant Accident Prevention Contest conducted by the Chicago Safety Council, which terminated on December 31st, by Samuel M. Havens, vice-president of the Chicago Safety Council in charge of Industrial safety. One of these plaques was won by the Ogden Division of the Container Corporation of America, which operated during the entire six months with over 420 employees without a single lost time accident.

Annual Meetings in New York

National Conferences of Manufacturers and Merchants of Pulp and Paper at Pennsylvania Hotel, February 16-20, 1931, Draw Representatives from Every Section

THE series of meetings of pulp and paper manufacturers, paper merchants, and of associations affiliated more or less directly with the parent organization, the American Paper and Pulp Association, which were held in New York at the Hotel Pennsylvania during the week of February 16, brought a large turn-out of members from all parts of the United States and Canada, much larger indeed than was expected, in view of the condition of trade. That the business situation is improving, with some prospect of an early return to normal conditions, was made evident by the optimistic utterances of leading representatives of the paper industry, both in formal reports and in interviews with representatives of our own publication.

The American Paper and Pulp Association paid Sidney L. Willson the unusual compliment of re-election as president for a third term. Apart from his special qualifications for directing the affairs of a great national organization, it was deemed advisable to continue Mr. Willson in office in order to insure the carrying out of policies made necessary by the reorganization of the association which was effected at last year's meeting. It will now be possible to give the new policies a fair try-out for another year, with Mr. Willson and the executive staff and committees under which the reforms were effected, in charge.

Sidney L. Willson
President, American Paper & Pulp Association

New Officers of the A. P. & P. A.

As stated, S. L. Willson, president of the American Writing Paper Company, Inc., was re-elected president of the association at the annual meeting on the closing day of the convention, but changes were made in the personnel of vice-presidents and the executive committee by the election of George H. Mead, president of The Mead Corporation, and W. L. Carter, president of the Nashua Gummed and Coated Paper Co., as vice-presidents, the new members of the Executive Committee comprising George W. Houk, vice-president of the Hawley Pulp and Paper Co., Henry D. Schmidt, president of the Schmidt & Ault Paper Co., and David L. Luke, Jr., of the West Virginia Pulp and Paper Co. The other members of the executive committee, reelected at this meeting, are D. Clark Everest, A. H. Graustein, and Norman W. Wilson.

A Banquet Innovation

A complete innovation was made in respect to the annual banquet of the American Paper and Pulp Association, which this year took the form of a stage performance or tableau depicting happenings in a lumber camp somewhere in the north woods, to the accompaniment of songs and music by performers dressed to resemble French-Canadian lumber jacks and their womenfolk. The surprise of the performance was furnished by the appearance of a former president of the association in the role of an actor, though his identity was not wholly revealed.

Banquet Hall Transformed

The stage effects and decorations of the ballroom in which the banquet was held were a pronounced success. A dark blue canopy through which lights twinkled gave the illusion of a sky, and a stage background of snow-clad mountains came into view to complete the picture of an outdoor scene in a pulpwood region, while hundreds of young spruce trees were disposed along the walls and inserted here and there among the stage properties in the crevices of the mountains to complete the illusion. Instead of the conventional flower displays, potted spruce shoots appeared on tables. The utmost jollity prevailed and any who might be disposed to criticize the musical performance and acting of the lumberjacks and their feminine supporters overlooked their shortcomings in the general enjoyment of the evening. There was no formal speechmaking, President Willson reading a carefully prepared address, which was followed by a humorous disquisition on the foibles and frailities of human beings, interspersed with witty sayings and side-splitting jokes, by Dr. Hiram L. Webb, who was listed on the program as a post "prandialist."

New Officers of National Paper Trade Association

At this year's meeting of the National Paper Trade Association officers were elected as follows:

President—Arthur W. Blackman, D. F. Munroe Co., Boston.

Vice-Presidents: Fine Paper Division—J. F. Miller, Chope-Stevens Paper Company, Detroit; Wrapping Paper Division—S. L. Wellhouse, National Paper Company, Atlanta, Ga.

Treasurer—Charles Addoms, Miller & Wright Paper Company, New York.

Detailed reports of the proceedings of the different associations are given in succeeding colums.

Reports Submitted at the General Meeting

At the general meeting of the American Paper and Pulp Association on Thursday, February 19, progress reports were submitted by the director of the Cost Department, the Secretary of the Pulpwood Department and the engineer having charge of waste recovery. In addition, the chairman of the Supply and Equipment Section reported and there was a committee report from the Central Research Committee, the Tariff Committee, Simplification and Standardization Committee, Approved Pulp Testing Chemists Committee and the Arbitration Committee.

Standardization of Samples—The report of the Standardization Committee was quite lengthy and was printed as a separate pamphlet. One of the points brought out was that the United States Government is an offender against its own

campaign for the standardization of commodities and this was made the subject of a resolution which was adopted at the afternoon sitting requesting the president of the American Paper and Pulp Association to appoint a committee to study the Standardization Committee's survey and afterwards present a definite plan for establishing standard sizes for sample books, a simplified method of filing and a distribution plan to prevent excessive duplication with its tremendous cost of printing, mailing and postage. It was also provided to appoint a committee for co-operation with the National Paper Trade Association.

The report was presented in its entirety by Robert C. Fay, of the American Writing Paper Company, who is chairman of the Standardization Committee.

A resolution subsequently offered had evidently some relation to a criticism embodied in the Standardization Committee's report. It was recommended that the Government Printing Office use a standard letterhead size of 8½ x 11, instead of the non-standard size of 8½ x 10 now used. Senator Moses will be approached by the association to order the change, as he is chairman of the joint committee on paper and printing.

Jesse H. Neal
General Manager, American Paper & Pulp Association

Work of the Statistical Department—J. Kavanagh, reported as director of the Statistical Department, who described the work in progress and in prospect. Manufacturers of pulp and paper had approached the association in growing numbers during the past year with requests for statistical services. Mention was made of the services to the industry of the **Weekly Business Review** published by the Statistical Department. In a monthly statistical summary giving a cross section of pulp and paper industry operations, the director of the Statistical Department acknowledged co-operation in compiling the data on the part of the Cover Paper Manufacturers' Association, the National Kraft Paper Manufacturers' Association, the National Sulphite Paper Manufacturers' Association, the News Print Service Bureau, Paperboard Industries Association and the Writing Paper Manufacturers' Association.

A report of the Cost Department formed part of a series of progress reports which were available to members on the chairs they occupied. This report reviewed the activities of the department and it was shown that in all of these, which are now conducted in the name of the American Paper and Pulp Association, the work is conducted in strict accordance with the rulings of the Federal Trade Commission and other governmental departments.

C. M. Baker, engineer of the American Paper and Pulp Association, discussed in his report the savings possible in white water utilization by the application of methods suggested by the Engineering Department in mills visited during the past year. He described in detail the various steps to be taken in the development of white water utilization.

Sulphite waste liquor continued to be the critical factor in the association program to improve stream conditions. Methods that have been or are being developed to recover by-products from the liquor are said to be operating economically in certain parts of the country and under certain local conditions. In general, however, it was considered that a satisfactory and economical method of sulphite waste liquor utilization was not yet available to the industry.

Mr. Baker included in his report a number of suggestions regarding the appointment of an advisory committee to consider bills in the various state legislatures, or in congress, to control stream pollution.

Importance of Pulpwood—The importance of pulpwood in our international relations was stressed by Charles W. Boyce in his report. A study of forest conditions in Norway, Sweden, Finland and Russia was undertaken and information resulting therefrom had appeared regularly in the department's official publication "Pulpwood."

This may be a good place to insert a note of the denial made by M. S. Makodzub, vice-president of the Amtorg Trading Company, at a meeting of the Pulpwood Department on Tuesday afternoon. No convict labor was used in the production of lumber, he said. Pulpwood cutting was done chiefly by peasants used in the time of year when farming is impossible. Mr. Makodzub enlarged on this by saying: "We have a habit in Russia that 'he who does not work may not eat.' That applies to the entire nation, so that while it was apparently forced labor, it is in fact merely a habit of a people and not enforced labor in the usual sense of the word."

Central Research Committee—A progress report on the work of the newly-formed Central Research Committee was made by R. G. Macdonald, secretary of the committee. The committee has devoted its efforts to obtaining a clear grasp of existing governmental facilities as a basis for the formulation of definite suggestions in order to bring about a maximum degree of benefit to the industry.

Tariff Committee's Acknowledgments—In the report of the Tariff Committee of the association reference was made to the changes to effect through clarification of the language, to elimination of ambiguities and the addition of precise definitions. Tribute was paid to the Import Committee of the American Paper Industry for supplying detailed knowledge of competitive conditions, and especially to Warren B. Bullock, manager of the committee. This report was signed by M. E. Marcuse, chairman.

Arbitration Recommended—A report of the Arbitration Committee was submitted by E. H. Naylor, chairman. This constituted a study of commercial arbitration and the benefits of it to members of the American Paper and Pulp Association, the results justifying in an overwhelming way the wisdom of using arbitration. The question now is as to whether the actual operation of an arbitration plan should be undertaken by the grade association or the national association.

Supply and Equipment Exhibition

The Supply and Equipment Section of the American Paper and Pulp Association, under the direction of W. N. Wilkinson, president of the section, arranged an exhibit by members which attracted a good deal of attention. Despite necessarily restricted space around the corridor of the ballroom and limited hours of display caused by shutting off the electric light during the periods in which the ballroom was occupied by the Technical Association, the exhibit afforded a good opportunity for members and visitors to inspect new and improved machinery and apparatus, as well as for the discussion of technical and equipment problems.

The Supply and Equipment Section has increased its activities during the year. A classified list of the equipment and supplies which the members produce for sale to pulp and

paper manufacturers was compiled and published in an attractive booklet as a handy compendium of paper mill supplies, and copies were sent to every paper mill in the United States. According to a statement by President Wilkinson, the Section has contributed to a greater extent than in previous years both time and funds to the support of the American Paper and Pulp Association, effecting in this way an admirable co-operation with the organized pulp and paper manufacturers of the country.

Notes of the Exhibits

Brief descriptions are appended of the more interesting features of the various exhibits.

Allis-Chalmers Manufacturing Company, Milwaukee, Wis., featured the Allis-Chalmers Texrope Drive by means of a model set-up. Literature and illustrations were available of Type "S" centrifugal and Type "SSSOR," stock pumps. The firm designs and manufactures standardized centrifugal pumps of all kinds for paper mills, these being described in Bulletin 1632 H. Booklets describing the Thorne barking system and rod mills were distributed.

The Bausch & Lomb Optical Company, New York, had on display, among other scientific optical equipment, the papermaker's microscope for study and photography of paper surface textures; also the Euscope and microscope for fiber examination and establishing control of beating processes. Included among other apparatus for process control, Bausch & Lomb exhibited the binocular microscope for stereoscopic examination of pulp, as well as research and chemical microscopes showing how fine pulps and impurities appear under oblique illumination and polarized light. A hydrogen-ion colorimeter and desk and pocket magnifiers were also shown.

Beloit Iron Works, Beloit, Wis., displayed illustrated folders descriptive of suction couch rolls, paper machines and removable fourdriniers.

Bird Machine Company, East Walpole, Mass., distributed literature describing and illustrating the Bird centrifiner, the Vickery doctor, Bird screen, Bird save-all and shower pipe and the Vickery felt conditioner. Copies of the **Stuff-Box** and folders were available to all visistors to the booth.

Cameron Machine Company, Brooklyn, N. Y., exhibited a new type of slitter for which special advantages are claimed, as for instance, a cleaner cut due to a sharper slitter wheel; the elimination of side play and friction, thus assuring accuracy of cut and longer life of slitter. Featured were illustrations of a new roll unloading device, the Gravity Roll Unloader, which works automatically and is particularly adapted for service on high speed and extra wide machines. A new supercalender winder, known as Camachine 48 Model 9, is said to produce practically faultless rolls of supercalendered paper. This machine provides for the feeding of the web to the calender, rewinding it into rolls, passing the web through two or more times if desired, and finally trimming the edges and slitting the web into shipping rolls of any size called for.

Chromium Corporation of America, New York, attracted considerable attention with their display of chromium plated rolls and evaporator tubes, screen plates, suction box covers, slitters and cutters and other mill accessories. The company has developed and perfected methods of applying their trademarked chromium plate, "Crodon" to protect plated surfaces against wear and corrosion, steel, iron, copper and most other metals being successfully plated so as to increase the average productive life of equipment from one to six times. During the past year the Chromium Corporation of America has established close contact with the paper industry.

Eastwood Corporation, Belleville, N. J., had perhaps the most imposing exhibit from an engineering standpoint of any to be seen. The main display was a 10-inch acid-bronze digester Blow-off Valve of the Belleville type, which was shown in operation. The electrical operating mechanism provides for remote control and is said to give the greatest possible factor of safety. Standard quick-opening gate valves with the swing top were also shown. Two types of operating mechanism provide ease and safety of manipulating the valves, one being adapted for chain operation and the other for air or hydraulic operation. In addition to the valves referred to above, a line of double disk gate valves were exhibited. These were represented to constitute a radical advance in design of gate valves, of great interest to pulp and paper mills. The standard fourdrinier wires and cylinder cloth in which the Eastwood Corporation has specialized for more than a half century were also featured. An easy "In Praise of Paper," printed on vegetable parchment, with illuminated initials after the style of an ancient monkish missal, was distributed as a souvenir of an admirable display.

Fibre Making Processes, Inc., Chicago, had an exhibition, in addition to booklets and other descriptive literature, one of the first pieces of wood barked in the first American Barking Drum operated in 1915 at the mill of the Escanaba Paper Company, Escanaba, Mich. Since that time, according to a label on the exhibit, over 350 American Barking Drums have been placed in use in American pulp mills. Other machinery and apparatus described and illustrated in circulars and booklets were the Giant Nekoosa Bark Press, Helin's Beater Filling, the Morterud System of cooking and the Fibre Making Process coarse screen.

Fidalgo Drying Systems, Inc., New York, gave a demonstration of the Newnap Felt Conditioner, and attendants explained the operation of other machinery and apparatus controlled by Fidalgo Drying Systems and E. D. Jones & Sons Company. These include dryers for different grades of pulp, mill screenings, waste wood and bark.

Foreign Paper Mills, Inc., 314 Broadway, New York, made an impressive exhibit of paper testing apparatus, the great new precision bursting-strength tester known as the Schopper-Dalén being displayed prominently. This tester is equipped with two gauges, one, the lower gauge, registering the bursting test by compressed air in pounds per square inch and the other an upper gauge, an expansion test by height of bulge indicated on it. Both paper and board can be tested on this machine, which is of extremely solid construction and when clamped to the floor permits of comfortable operation by a person of average height. A Schopper stiffness tester for determining the relative stiffness of paper and board as in file folder stock was also noticed. A large porosity tester or densometer attracted attention, as did also an abrasion tester for determining the surface condition of ledger and other papers subject to erasures, rubbing in files, etc. The Schopper-Riegler Freeness Tester was also on view, together with folding testers, quadrant and other scales and balances, as well as tensile testers.

General Electric Company, Schenectady, N. Y., demonstrated the G. E. Mechanical Drive Turbine and attendants at the booth gave out booklets and folders descriptive of the complete line of turbines manufactured, in addition to literature on arc welding in industry. By means of a photo-electric relay, the operation of the Straight Line Thrust was shown and a G. E. Induction motor was exhibited.

Grasselli Chemical Company, Inc., Cleveland, made an exceptionally attractive display of chemicals used in the paper industry and in boiler plants. In addition to pigments, there were shown choice specimens of soda ash, caustic soda (liquid and solid), sodium silicate, alum, salt cake and trisodium phosphate. The last-named is recommended for use as a felt cleaner, in addition to its other well-known use as a preventive of boiler scale.

International Nickel Company, Inc., New York, showed monel metal in many convenient forms, including jordan fillings, suction box stay rods, bolts, nuts and accessories, besides pure nickel and seamless monel for evaporator tubing.

International Paper Company, New York, under the direction of Herb. Lippitt, made a display of spiral wound cores with steel caps which held the interested attention of visitors. The cores of varying sizes were arranged on an easel rack in pyramidal formation, with the smaller cores at top. The caps, of Lippitt's invention, are of polished steel and exceedingly durable.

Minton Vacuum Dryer Corporation, Greenwich, Conn., exhibited a large blue print of an installation of Minton vacuum dryers in the pulp mill of the Weyerhaeuser Timber Company, Longview, Wash., besides a number of photographs illustrative of paper machines in mills throughout the United States and Canada equipped with Minton vacuum dryers.

The Moore & White Company, Philadelphia, paper machine builders, exhibited their Quick Removable Ball Bearing Top and Bottom Slitter and gave out folders and booklets descriptive of the slitters and winders manufactured. The Moore & White Electric Drive for winders is said to wind better rolls at lower cost, as a consequence of reduced operating and maintenance costs. Four-drum winders, with collapsible winder shafts and ball bearing slitter parts, were featured in the literature.

Noble & Wood Machine Company, Hoosick Falls, N. Y., manufacturers of jordans and beaters for nearly half a century, are noted for the production of laboratory or miniature beaters to handle as little as 12 oz. of stock, and of mammoth beaters with a capacity of 100 tons a day. Booklets and folders descriptive of the pulping engines, circulating tanks and wet machines made by this firm in addition to jordans and beaters were available to all visitors to their booth.

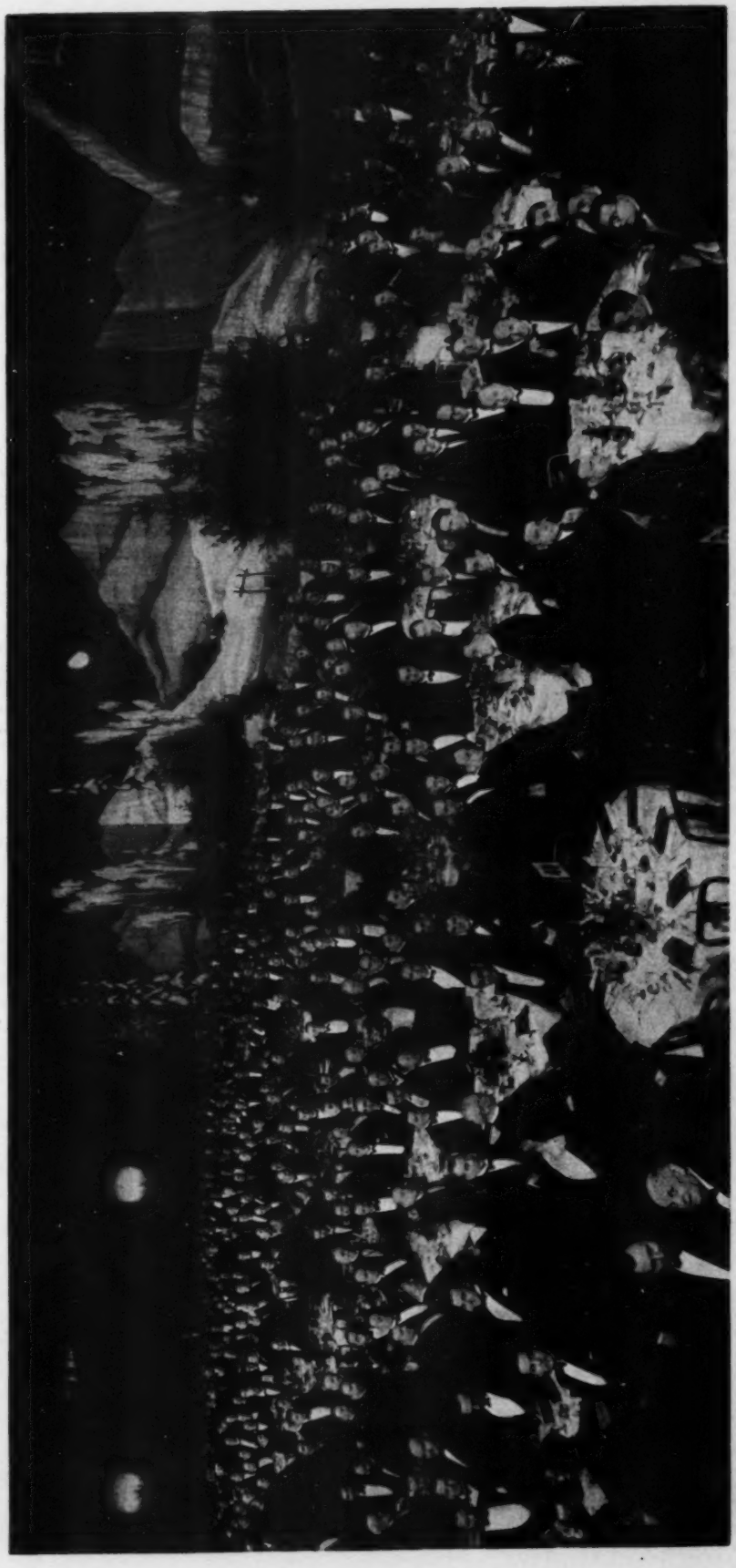
Oliver United Filters, Inc., San Francisco, exhibited a model thickener and distributed literature descriptive of save-alls, deckers, bleachers, bleach washers, and lime mud filters. The Oliver United Save-All is featured as a saver of fiber, water and heat, and one that functions with least operating and maintenance cost.

The Permutit Company, New York, showed a model of a Permutit Water Softener and demonstrated by means of text and illustrations the method of removing oil from condensate and the economies to be effected thereby. A boiler blow-off hydrometer and photographs of various other apparatus manufactured by the company were also on view.

J. E. Rhoads & Sons, Philadelphia, of Tannate belting fame, displayed specimens of belting and, to those likely to appreciate the volume, gave copies of an admirable work on belt problems bearing the title **Belt Users' Book.** Of convenient size and attractive appearance, this book will be valued by all who have to do with the driving of machinery by belting.

The Thew Shovel Company, Lorain, Ohio, demonstrated the Thew-Lorain Pulpwood Grab and Crane by means of a projectoscope, giving an animated picture of the working of their pulpwood grab and crane, which is capable of taking up half a cord of wood from a block pile at a time and of conveying 45 cords an hour.

The W. S. Tyler Company, Cleveland, manufacturers of fourdrinier wires, cylinder cloth, and woven wire cloth for all commercial purposes, made an interesting display, featuring descriptions of their Hum-mer Electric Vibrating Screen



Picture taken at the fifty-fourth annual banquet of the American Paper and Pulp Association, February 19, 1931, at the Pennsylvania Hotel, New York City

which is used in sizing wood chips. Testing sieves used in making analyses of the wood chip sizes were shown, in addition to the bronze and brass fourdrinier wires and cut cloth, as well as fine Monel samples and material made from various stainless steels in which so much interest is now taken.

Affiliated Groups Hold Meetings

Meeting of the Salesmen's Association

The business meeting of the Salesmen's Association of the Paper Industry was held in the foyer of the banquet hall on Wednesday, February 18.

A reorganization was effected by merging the New England Division with the New York Division into one group to be known as the Eastern Division; a similar merger of the Miami Valley and Chicago Division will be known as the Mid-Western Division. The Executive Committee of the association will consist of the national president and the chairmen of the newly-formed Eastern Division and the Mid-Western Division, together with three chairmen of standing committees to be named by the national president, who is Harold R. Knott, Chicago representative of the Eastern Manufacturing Company. The vice-president in charge of the old New York Division, now the Eastern Division, is Francis H. Purington, representative of the Eastern Manufacturing Company, in New York, while Creighton Whiting, of the American Writing Paper Company, will preside over the Mid-Western Division in Chicago.

The annual luncheon followed the business meeting. As a headliner for the after-dinner speaking, William M. Chenery, editor of Collier's, was there to tell of the iniquities of the Eighteenth Amendment or prohibition law. There was no question in his mind about the law being repealed; it was only a question of when and how.

Writing Paper Manufacturers' Association

The usual meetings of the Writing Paper Manufacturers' Association were held in connection with the conventions during Paper Week at the Hotel Pennsylvania. The election of officers was marked by the choice for president for a second term of Col. B. A. Franklin, of the Strathmore Paper Company; vice-presidents elected being G. S. Morse, Valley Paper Company, who will have charge of the Rag Division of the association, and Harrison Baldwin, of the Hammermill Paper Company, in charge of the Sulphite Bond Division. E. H. Naylor was reelected secretary-treasurer, and the personnel of the Executive Committee consists of Col. B. A. Franklin; G. S. Morse; Harrison Baldwin; A. C. Gilbert, Gilbert Paper Company; J. E. Holmes, Chemical Paper Manufacturing Company; Norman Bardeen, Lee Paper Company, and F. A. Leahy, Eastern Manufacturing Company.

Tissue Paper Manufacturers' Association

Officers elected at the annual meeting of the Tissue Paper Manufacturers' Association during convention week were:

President—Austin E. Cofrin, Fort Howard Paper Company, Green Bay, Wis.; vice-president—M. L. Dinkelspiel, National Paper Products Company, New York; secretary-treasurer—Herbert Thwaite, New York; Executive Committee—Roger W. Bell, A. P. W. Paper Company, Albany, N. Y., and B. F. Picola, Gotham Tissue Paper Corporation, New York.

Waxed Paper Men Addressed on the Business Situation

The American Waxed Paper Association held four conferences of its various divisions but no election was held as its annual election is held in December of each year.

In an address at the luncheon meeting of this association, Monday, July 16, Ross Kenyon, vice-president of the Brookmire Economic Service, discussed the economic outlook. He began by saying that business was now at a dead level of inactivity. Whether or not the extreme low point had been passed, or was right at hand or was somewhere immediately ahead of us did not matter. He had been impressed by the queerness of the situation.

"The present situation is full of abnormalities. There is too much wheat in the world and yet people are starving. We have an oversupply of cotton and wool, and at the same time many people are suffering from cold from lack of proper clothing. There is plenty of material wealth of all kinds but it is not in the hands of those who need it. This brief statement of the situation makes it obvious that the difficulty is not with our ability to produce. Something has gone wrong with the mechanics of distributing purchasing power."

Factors that Favor Improvement—He drew attention to certain unfavorable factors in the present situation, chiefly overproduction, and turning to favorable items said money was cheap and plentiful; it is being easily obtainable for any sound interprise at low cost. It should be noted, too, that for several months consumption in many lines has been exceeding production. Stocks of goods on hand are being reduced, and added to this, many commodities were actually selling below the cost of production. He thought time was the most important element of the cure for bad business conditions.

Cover Paper Manufacturers' Association

At a meeting of the Covered Paper Manufacturers' Association, officers for 1931-1932 were elected as follows: President—J. B. Shepherd, Peninsular Paper Company, Ypsilanti, Mich.; vice-president—W. H. Howes, Knowlton Brothers Company, Watertown, N. Y.; Secretary-treasurer—E. H. Naylor, 95 State street, Springfield, Mass.; Executive Committee—J. B. Shepherd, chairman; W. H. Howes; B. A. Franklin, Strathmore Paper Company, Mittineague, Mass.

Glazed and Fancy Paper Manufacturers

During the week of meetings an election for officers of the Glazed and Fancy Paper Manufacturers' Association was held with the following result: President—John B. Van Horn, Holyoke Card & Paper Company; vice-president—John McLaurin, McLaurin-Jones Company; secretary-treasurer—Leonard I. Houghton; members of Executive Committee besides the officers—H. W. Tunstall, A. M. Collins Manufacturing Company; Geo. R. Peabody, Louis Dejonge & Co., and A. G. Post, National Coated Paper Corp.

Gummed Tape Manufacturers

The standing committee of the Gummed Tape Manufacturers' Association on Simplified Practice Recommendations at its meeting on Monday, February 16, decided to reaffirm for another year the present recommendations. The following officers were elected for the ensuing year:

President—W. K. Gerberick, Central Paper Company, Menasha, Wis.; vice-president—L. A. Bassett, McLaurin-Jones Company, Brookfield, Mass.; secretary-treasurer—Douglas A. Crocker, New York.

National Kraft Association

The National Kraft Paper Manufacturers' Association held several sittings during the convention. The following officers were elected:

President—Aytch P. Woodson, Mosinee Paper Mills Company; vice-president—J. E. Alexander, Nekoosa-Edwards Paper Company; secretary-treasurer—Major O. M. Porter; Executive Committee—Aytch P. Woodson; J. E. Alexander, and P. P. Schnorbach, Filer Tire Company, Filer City, Mich.

The headquarters of the association will be transferred from New York to Chicago on April 1.

Southeastern Supers Plan Spring Meeting

The Southeastern Division of the American Pulp and Paper Mill Superintendents Association, announces that its spring meeting will be held at Richmond, Va., the Jefferson hotel, April 10 and 11. Rates are very reasonable and reservations should be made direct with N. K. Whitman, assistant manager, Jefferson hotel, Richmond.

The program has not been completed but those in charge promise an interesting meeting, and extend a hearty invitation to members and friends of the Division as well as their wives. Friday will be devoted to papers, round table discussions, etc., while the following day will be given over to sightseeing, golf and entertainment.

This Year's T.A.P.P.I. Meeting

Amazing Diversity of Subjects Discussed at Annual Meeting Under New Divisional Management Plan

ATTENDANCE at the sixteenth annual convention of the Technical Association of the Pulp and Paper Industry, held at the Pennsylvania Hotel, February 17, 18 and 19, 1931, was fully up to expectations, the large ballroom of the hotel being comfortably filled when President Maxamillian Krimmel started the proceedings on Tuesday morning at 10 o'clock by calling the roll of members who had passed on during the past year and requesting the audience to stand for a minute in silent tribute. He then read the annual address of the president in which he discussed the activities of the association, touching on past accomplishments, present activities and future projects.

Maximillan A. Krimmel
President, Technical Ass'n, Pulp and Paper Industry

Points in the President's Address

Emphasizing the importance of service by members, he pointed out that it was the function of the officers and members of the Executive Committee to provide opportunities for individual members to serve through committee work. A reorganization of divisions and committees had been effected so as to provide groups engaged in Management, Engineering, Raw Materials Studies, Operating, Testing and Research and Development. There was now a working organization for each field of interest, with committees properly classified and their functions defined.

Speaking of the value of local sections to the association, he said that a charter had been granted to the Lake States Section in Wisconsin and that another active group in another state was ready to petition for a charter.

The international relations of the Technical association received appreciative mention from President Krimmel. Technical men from other countries are members and their membership is valued.

The work of the Committee on Abstracts and Bibliography of which Dr. C. J. West is chairman was singled out for special commendation. As for the Chicago Century of Progress Committee, headed by Allen Abrams, this committee had been working under a handicap and it deserved and needed the support of the American Paper and Pulp Association.

President Krimmel said that the American Society for Testing Materials had recognized the good work on paper testing which had been done by T.A.P.P.I. and have solicited the approval and support of their own program for the development of standards for testing in which a standing committee for paper had been provided. The A.S.T.M. had asked T.A.P.P.I. to be represented on their committee A-10 on iron chromium nickel and related alloys, and J. D. Miller was appointed.

T.A.P.P.I. Manual Contemplated—The Technical Association has under consideration the publication of a T.A.P.P.I. manual on standard testing methods and standard practices which had been originally recommended by L. C. Reynolds, chairman of the Management Methods Committee. In addition to testing methods, the manual would contain the articles of organization, policies and regulations, governing standing committees, committee organization, local section organization, policies regarding papers for presentation and procedure at meetings.

President Krimmel stated that the Executive Committee wanted to be considered as a representing, as well as a the betterment of the association.

The address made grateful mention of the work of the secretary-treasurer, saying that much credit belonged to him for the splendid financial condition of the association.

Mr. Krimmel then brought up the subject of supplying trained technical men for the industry, saying that technically trained men and research were needed to solve the problems of improving quality of product, reducing costs and developing new materials. A forward step was taken in this direction when the Wisconsin mills under the leadership of Ernst Mahler and D. Clark Everest brought about the foundation of the Institute of Paper Chemistry at Lawrence College, Appleton, Wis.

T.A.P.P.I. and Research—In answer to the question, What is T.A.P.P.I. doing about research? it was pointed out that in conjunction with the American Paper and Pulp Association it was sponsoring a three-year research scholarship at the Forest Products Laboratory. The excellent results obtained had fully justified this action. It was remarked that T.A.P.P.I. had in its membership a majority of the research people of the industry, as well as of government and scholastic institutions who are engaged in pulp and paper mill problems. The association also had contact through members with work being done on fundamental raw materials of our industry in the Cellulose Division of the American Chemical Society. Enlarging on this subject, President Krimmel stated that for a period of years the association had advisory committees on research for the Paper Section of the Bureau of Standards and the Forest Products Laboratory. Two years ago T.A.P.P.I. recommended to the American Paper and Pulp Association that there be one central research advisory committee to co-ordinate research on pulp and paper being conducted by the various government and scholastic institutions. This committee of the American Paper and Pulp Association, consisting of T.A.P.P.I. members, was now functioning.

The Pacific Coast Section—President Krimmel said he was indebted to the association for an interesting and inspiring trip last fall to the West Coast where he had the pleasure of meeting and addressing the numbers of the Pacific Coast Section. The meeting was well attended and intense interest was taken in committee work. The pulp and paper industry on the West Coast was, he pointed out, comparatively young and the technical men were pioneering in certain respects,

especially in connection with the chief raw material—Western hemlock. The mills are modern to the nth degree and in them are incorporated the ideas gained from years of experience in pulp and paper manufacture. It should seem that there would be no technical problems in engineering and chemistry but that was not the case, Mr. Krimmel said. The technical men on the Pacific Coast had problems galore and were making good progress in meeting and solving them, their problems were to a certain extent our problems and they should receive consideration in the research programs of the government institutions. He considered it advisable to find some means of better spanning the distance gap so as to facilitate mutual rendering of service between T.A.P.P.I. members on the West Coast and the association in the east.

In closing, President Krimmel urged the members to assume their full share of individual responsibility in connection with the work of the association. He said that they could help by serving on committees, by attending meetings and participating in them and by contributing to the literature.

Report of the Secretary-Treasurer

The report of the secretary-treasurer was then called for and was presented by Ronald G. Macdonald. This was mainly an account of the activities of the association, much of which had been already covered in the president's address. No financial details were given but the condition of the membership was particularized, gains being reported for 1930, with an increase of 176 new members, making the total membership on December 31, 1930, 1,166, divided into 755 active members, 302 associates and 109 juniors. During the year, 69 members had resigned or were dropped, 11 corporate members had been added and 47 companies became contributing members. The corporate membership of the association numbers 92. Eight members died during the year.

The special inquiries and reports issued during the year numbered some 22 and were stated to be of considerable value. The problems presented dealt with practical manufacturing details and were initiated by individuals in the mills who encountered difficulties.

Association headquarters is being used to an increasing extent as an employment exchange and pulp and paper mill executives have shown a disposition to use the association as a medium for obtaining competent employees.

An account was given by Secretary Macdonald of the organization of two new sections of the association—the Lake States Section and the Pacific Section. Details were given in the report of new committees which had been formed as a result of the divisional plan of organization which was adopted recently.

Committee on Nominations

Following the report of the secretary-treasurer, a Committee on Nominations was appointed consisting of P. H. Glatfelter, John Traquair and F. C. Clark, with instructions to report at the next general session on Thursday afternoon.

Sales of Textbooks

A report for the Textbook Committee was then presented by R. S. Kellogg. In this it was stated that 22,467 volumes of the textbooks on **The Manufacture of Pulp and Paper** had been sold to date. The sales for the year 1930 amounted to 1,090 volumes. A French translation of the books was now available and the French of Volume V had been exhibited at the meeting of the Canadian Pulp and Paper Association at Montreal in January. The translations were made in France and the book published in Quebec.

Progress at the Institute of Paper Chemistry

Dr. Otto Kress was invited to review the work of the Institute of Paper Chemistry and responded with an oral report of progress. The Institute had opened with three full-time students and two paper mill men. Today some 60 students have matriculated, with only one registered from Wisconsin.

Doctor Kress spoke of the fine library of books relating to pulp and paper manufacture, cellulose and related subjects, which was now housed at the Institute. One year ago the library was nonexistent, while today the library is perhaps the finest in the country. He pleaded for the recognition of the Institute of Paper Chemistry by T.A.P.P.I. as the greatest school of papermaking in the country. He was a believer in the principle that teaching and research should go hand in hand.

Operating and Engineering Papers

Following the presentation of the foregoing address and reports, the joint program arranged by the operating and engineering divisions was taken up and F. W. Adams, assistant professor of chemical engineering at the Massachusetts Institute of Technology was invited to read his paper on "Steam Consumption in the Drying of Paper."

Methods of Measuring Steam Consumption

This paper dealt with methods of measuring steam consumption and Professor Adams in the course of his discussion gave a formula which had been developed for checking actual steam consumption as compared with theoretical steam consumption, as follows:

$$\frac{(\text{Theoretical steam consumption})\left(1+\frac{.4(\%\text{ time down})}{100-(\%\text{ time down})}\right)}{\left(1-\frac{\%\text{ Broke}}{100}\right)\left(1.005-\frac{\%\text{ Trim}}{100}\right)\left(1-\frac{\%\text{ Steam Bypassed}}{100}\right)}=\text{actual steam consumption.}$$

The paper machine operating factors affecting drying are indicated.

The Efficiency of a Dryer—Professor Adams prefaced his study of conditions affecting steam consumption with a cautionary statement regarding comparisons of results of mill tests, which unless attacked cautiously might lead to erroneous conclusions. The variety of equipment, of methods of operation, and of means of expressing operating results demanded thorough study to yield satisfactory operating or cost data. "Probably the most common pitfall in the field of drying is encountered when one starts to talk of the efficiency of a dryer. The drying operation, when viewed from the point of view of steam economy, must include not only all of the steam fed to the drying rolls, but also all of the steam required to supply heat to any part of the drying operation. This must necessarily include the steam required to keep the machine room at a suitable working temperature, either by direct radiation from coils or as heat supplied to the ventilating air. It is illogical and meaningless to talk of the thermal efficiency of a dryer apart from the consideration of heat requirements of the machine room. The dryer is an integral part of the machine room and its effect on steam consumption is tied up with the operation of the room. The whole picture is essential to a rational analysis of steam consumption in the drying of paper."

Quality of Steam—In discussing the paper, W. G. MacNaughton called attention to the need of determining the quality of the steam used, particularly in measuring steam consumed by dryers. It gave him pleasure to see a paper of this kind on paper drying.

Conditions Affecting Paper Drying

In the second paper on "Transfer of Heat Through Cast Iron Dryer Shells," by F. C. Stamm, of the Upson Company, the author gave a list of what he termed the variables that influence drying of paper. The limiting factor in production is the capacity of the dryer section. This applies to most of the older machines in use. Beaters, jordans, pumps, screens and even the wet end could be speeded up, but not so with the dryers. On any one grade of paper there seems to be a definite limit in speed, and if that speed is exceeded, damp paper will be wound on the reel. The factors directly affecting the transfer of heat through dryer shells were said to be oil and scale on the inside of the dryers and rust and size accumulations on the outside. Other factors were water film on the inside, air film between the paper and dryers, circulation within the dryers, accumulations of condensate and air within the dryers. The water film caused by condensation on the inside of the dryers causes slight resistance to heat flow and the air films between the dryer and the sheet may be offset by closer contact between sheet and dryer.

Mr. Stamm said that circulation of steam through a dryer was of no advantage if air is removed and an accumulation of water inside the dryer does not materially affect the heat transfer, provided the water does not rotate with the dryer.

Accumulation of air inside the dryers was, he said, the only factor having any considerable effect on heat transfer. Curves were exhibited to show how paper and dryer temperatures varied under actual operating conditions.

Conclusions—The conclusions drawn by Mr. Stamm, from his work on heat transfer, indicated the need of observing the following precautions:

1—Keep the dryers clear of scale and rust inside and out.

2—Keep the sheet pressed against the dryers as tightly as permissible.

3—Maintain enough circulation through the dryers to carry away all the air.

4—Watch the surface temperature of the dryers continuously in order to be sure that you are getting the best possible heat transfer.

5—See to it that every dryer is up to temperature and not operating at a temperature of 5.7 or ten degrees below normal. Remember that the average heat head between the dryer surface and the evaporating temperature of the sheet is around 40 and that even a small drop of only five degrees has reduced the effectiveness of this dryer 12½ per cent.

Discussion of Mr. Stamm's Paper

In reference to Mr. Stamm's injunction in one part of the paper to take the surface temperatures of dryers with a pyrometer, Professor Adams said he could corroborate what had been said about measuring the temperatures in this way. Mr. Stamm had said that the only sure method of determining the exact condition of a dryer was by taking the surface temperatures with a pyrometer. That the usual method of holding a thermometer in the pinch between the dryer and the sheet was misleading since all it showed was the evaporating temperature of the water in the sheet.

Differences with High Speed Machines—James d'A. Clark said he had used a Cambridge pyrometer but had never found any temperature to exceed 198 deg. Fahr. and he could not understand how Professor Adams had been able to record the high temperatures referred to in his paper.

Professor Adams intimated that high-speed machines might give different results, assuming that Mr. Clark's investigations had been made on machines of that type.

Mr. Slater Advocates Good Housekeeping—Joseph H. Slater, of the Escanaba Paper Company, discussed the point brought up by Mr. Stamm regarding coated dryers. He said he would regard coated dryers at the wet end as a faulty condition and counselled keeping them perfectly clean and polished. Keep the dryers clean of rust and scale inside and out, he said, and keep the heat pressing as lightly against the dryer as permissible. It was regrettable that machines were built in such a way as to make it difficult to see the inside of the dryers and the action of the siphons, but the whole thing resolved itself down to a question of good housekeeping.

D. D. Uong, of the Fitchburgh Paper Company, called attention to the differences in heat between the front part of a dryer and a back part; dryers equipped with evacuators are hotter in the back part than in the front part, except where siphons are used, when conditions are reversed, the dryers being hotter in the back part than in front.

Mr. Stamm asked what kind of circulating system was used and was told "tripping," which brought the remark from Mr. Stamm that tripping a dryer does not rid it of air, and a little bit of air would throw a dryer out of balance, much of the eratic drying being caused by air in the dryers.

Oil and Moisture Retard Heat—F. C. Farnsworth, of the Farnsworth Company, said he had listened with a great deal of interest to the discussion, since he was engaged in the business of extracting air and water from dryers. A pound of steam would evaporate only so much water and it was important to remove the elements that retard the flow of heat from dryer to paper. The chief retarding factors in his opinion were oil and moisture. As to differences in temperature at the front and back ends of the dryers, he said the heat transmission should be lower at the wet end than at the front end.

Drying Paper in a Vacuum

Ogden Minton was then recognized to give his paper entitled "At What Temperature Should Paper Be Dried." He did not stick to the text of his paper but discussed the subject in a general way, with particular application to the influence of sizing and heat of drying on the strength of paper. He complimented Mr. Stamm on his paper, saying that he had done good work in debunking what people believe takes place in a dryer shell. He showed various specimens of paper dried at different temperatures and expressed his lack of confidence in the use of pyrometers and thermometers. It was his experience that as the temperature of drying increased, the sizing improved, but the Mullen dropped, indicating that at high temperatures the strength of the paper falls and the sizing increases. With the use of a vacuum dryer, paper could be dried at any temperature, the only thing necessary being to vary the vacuum maintained in the dryer. In this way, any drying temperature from 85 deg. Fahr. up to and even more than 212 deg. Fahr. could be obtained.

A Note on "Hydration"—Mr. Minton reminded his hearers that paper does not give up steam in passing under the dryers, but only at the passes between dryers. He said that the two things which controlled the strength of a sheet of paper were the actual strength of the fibers used and the bonding of these fibers together. Rosin, natural or otherwise might be in the furnish, or bonding might be obtained through a partial hydration of the fibers, which some assume is a jelly-like substance surrounding the individual fibers which, when the sheet is dried, tends to fill up the space between the fibers and cement them together. Others assume that hydrated cellulose is a separate chemical, but almost everyone admits the existence of hydrated cellulose to a greater or less extent in all papers and carried to the extreme in such papers as glassine, etc. Calendering increases the strength, probably hydrating the surface of the sheet, but hydration by calendering is something which has never been fully studied, though deserving of research. He said that, roughly speaking, it would appear that the most advantageous drying temperatures for most paper lay somewhere between 140 deg. Fahr. and 170 deg. Fahr., temperatures which are all possible in the vacuum dryer but not generally available on open paper machine dryer sections.

Temperatures in a Vacuum Dryer—Mr. Minton sought to combat a notion entertained by papermakers that the vacuum dryer is suitable only where extremely low drying temperatures are required. This was not the case, he declared, as it was possible to dry paper at a higher temperature on a vacuum dryer than on the open type of paper machine dryer and still maintain high efficiency. It was possible for the papermaker to determine experimentally the temperature at which he could dry his paper and he offered the facilities of the laboratory and experimental apparatus of the Minton Vacuum Dryer Corporation at Greenwich, Conn., to any papermaker for tests on any particular furnish.

On account of the approach of the luncheon hour, two of the papers intended for presentation and discussion at the forenoon sitting were held over for a later meeting, and three papers were read by title only. The papers held over were "Heat Conservation in Paper Mills," by D. K. Dean, of the Foster-Wheeler Corporation, and "Paper Machine Felt Operation," by R. W. Pattison. The papers which were read by title were, "Low Pressure Steam and Paper Machine Drying," by Donald Ross-Ross, Howard Smith Paper Mills, Cornwall, Ont.; "The Efficient Drying of Paper," by E. W. G. Cooper, Crown Willamette Paper Company, Camas, Wash., and "Suction, Couch and Press Rolls," by B. T. McBain, Portland, Ore.

A New Heat Exchanger

Reference to Mr. Dean's paper was made in our preconvention summary in the February issue. It is shown in the paper that the steam set free when a digester is blown and when paper or pulp is dried on machine contains heat units that should be utilized. The Foster-Wheeler Company has developed a heat exchanger which has been in use for more than a year to yield a saving of $15,000 annually per digester; a cooling tower is used to condense machine room vapors.

After announcements by the president concerning the meetings scheduled for the afternoon and a statement that there would be no changes in the committee personnel for

the ensuing year, the forenoon sitting of the Technical Association was adjourned.

DIVISION MEETINGS

During the afternoon, meetings were held in separate rooms of the Operating Division, the Management Division, the Testing Division and the Engineering Division, and the same program of divisional meetings was kept up on Wednesday forenoon. In the afternoon of Wednesday, a general session was held, with President Krimmel in the chair, at which a paper on "What Patents Mean to the Paper Technologist", was read by Joseph Rossman, and development reports were submitted by divisional and committee chairman.

Coated Paper Problems

The Operating Division met in Exhibit Room 6 with F. C. Clark, chairman, presiding, when reports were made by committees. Norman Clark, chairman of the Finishing, Processing and Converting Committee, was unavoidably absent from this year's convention but his report was available in preprint form. This reviewed the activities of the committee during the year and gave an outline of work in process toward the solving of vexing problems confronting the manufacturers of coated paper. The committee was divided into subcommittees for work on specific problems, which was stated to comprise: (1) Standard specifications for raw stock for various types of coating; (2) Standardization of methods for testing of raw materials; (3) Roll versus brush coating machines; (4) Standard methods for preparation of coating materials; (5) Standard methods for buying, evaluating and storing of pulp or lake colors.

Progress of Testing and Machinery—Touching on work in the testing field during the past year, it was noted that in Germany a method had been developed for the determination of transparency, and at the Government Printing Office in Washington, studies had been made of printing ink penetration. Work on the method of determining the fluff or fuzz on offset paper had been carried on and some minor improvements had been made in machinery, principally on coaters, waxers, and friction calenders. Enumerating improvements in the manufacture of special papers, mention was made of an impermeable abrasive paper, safety papers, methods for spraying colored papers, and an enclosed system for calender coloring of paperboard. Other improvements were referred to in roofing paper, waterproof papers and boards, greaseproof papers, paper fabrics and paper boxes.

Mr. Clark reviewed a number of papers which had been presented at the various meetings of the Technical Association dealing with coating materials, sizing and drying, as well as miscellaneous publications bearing more or less directly on the finishing and coating of paper.

Properties of a Good Casein

The importance of iso-electric point in manufacture of casein for paper coating was the subject of a paper from the research laboratories of the Bureau of Dairy Industry, U. S. Department of Agriculture, which was presented by R. W. Bell. The various methods of producing casein were described and the properties of casein, as regards the especially desirable characteristics for its use in paper coating were set forth. Thus it was shown that casein should be low in ash and free acid, should dissolve easily and have a high adhesive strength and good flowing properties. A pH of approximately 4.6 representing the iso-electric point was an important factor. The minimum solubility occurs at this point and this is the reaction at which the maximum hypothetical precipitation of casein occurs, uncontaminated with its compounds. An explanation was given of acidity as expressed by hydrogen-ion concentration. The smaller the pH value the greater the acidity. Reference was made to a paper by P. D. Watson in the **Journal of Industrial and Engineering Chemistry**, 1927 (19,1272.) in which a quick and easy method of determining hydrogen-ion concentration in terms of pH of whey and casein is given. A table was given to indicate the property of some acid caseins.

Amount of Alkali Necessary—With a commercial casein of a hydrogen-ion concentration of 4.6, the alkali required to bring a solution of it to pH 9.16 would be 8.7 cc of a tenth normal solution of caustic soda; it would take 6.0 cc. for a casein having a pH of 5.2, and 10.5 cc. for a casein having a pH of 4.2.

If 8.7 cc. had been taken as the standard amount of alkali required to dissolve each one of the three caseins and bring its solution to the uniform pH, the amount would have been too low by 1.8 cc. in one case and too high by 2.7 cc. in another, or in terms of per cent, 17.1 and 25.7, respectively.

The point was made by the author that the expense of paying for extra alkali, the troubles encountered owing to a too alkaline reaction and the formation of salts in a coating preparation might be largely eliminated by the use of a uniform and high-grade casein. Casein no matter how produced should have a pH of approximately 4.6 and a low free acid value.

A Study of Clays and Adhesives

The next paper presented bore the title "A Further Study of Paper Coating Minerals and Adhesives," the joint work of Merle B. Shaw, George W. Bicking and Martin J. O'Leary, Paper Section, Bureau of Standards. This gave the results of a series of studies on mineral coating materials, chiefly foreign and domestic clays, and described the equipment used. The American clays examined compared favorably with foreign clays as paper coating material and produced good printing qualities. Modified starches used as adhesive substances did not appear to adhere so well as casein or glue. Graded according to their clay suspension property, starch, casein, and glue stood first, and graded as to suitability of the coatings for ink writing the order was casein, glue and starch. It was stated, however, that, notwithstanding its lack of water resistance, modified starch had a number of attractive qualities, being cleaned without unpleasant odor and cheap.

Progress Reports

Brief progress reports were made by J. J. O'Connor on Standard Specifications for Coating Raw Stock; by O. W. Callighan on Testing of Raw Materials for Coating; by F. W. Egan on Roll vs. Brush Coating Machines; by B. K. Steadman on Preparation of Coating Materials, and Kenneth T. King on Buying, Evaluating and Storing of Pulp Colors.

White Water Utilization

The Management Division, P. H. Glatfelter, chairman, followed the Operating Division, when C. M. Baker, chairman of the Waste Committee, reported on White Water Utilization. After stating that an effort had been made to develop definite conclusions regarding various methods of white water utilization in actual use, he enumerated the points to be considered. A complete white water survey was necessary at the outset to determine existing losses and the extent to which expenditures for recovery were economically feasible. The methods were discussed in his report, and reference was made to the bulletin on "White Water Surveys" published by the American Paper and Pulp Association.

Necessary Steps—Items to be considered included the reduction of fresh water to a minimum, irrespective of white water utilization. This was necessary to economize water as well as to simplify the use of white water. The next logical step would be the recirculation and reuse of the white water without save-alls, thus reducing the amount of fresh water required, the recovery of fiber, and reduction of expenditures for save-alls and other recovery equipment.

The report stated that save-all equipment should be the last item of consideration with a view first, of recovering and utilizing fiber and papermaking material and returning the save-all effluent to the white water system; secondly of treating any residual white water which it might be necessary to waste.

In conclusion, it was pointed out that the application of any system required careful study and developments in any mill. Adjustments would have to be made in the manufacturing process to compensate for papermaking material formerly wasted, but returned into the system with white water utilization. Personnel would have to be trained to operate the systems successfully.

Treatment of Water Discoloration

As a contribution of the Waste Committee, a paper under

the title "Developments in Water Purification for Color Removal" was presented by A. S. Behrman, R. H. Kean and H. Gustafson, of the International Filter Company, Chicago. Some paper mills are situated in regions of highly colored surface waters and much interest is taken accordingly in developments and improvements in methods of color removal. The nature of coloring matter in water was discussed from chemical and colloidal standpoints. The action of alum and of chlorine in removing the coloring matter from surface water by coagulation and oxidation, respectively, received attention and the decolorizing ability of a special activated carbon marketed by the International Filter Company under the name Hydrodarco was emphasized in the paper, particularly as an adjunct to other purification methods. However, it was pointed out that each case of color removal was an individual problem which had to be investigated thoroughly before the most effective and economical answer could be found.

Paper Testing Methods

The Testing Division, E. O. Reed, chairman, met in the brand ballroom on Tuesday afternoon, when the Paper Testing Committee, B. W. Scribner, chairman, presented progress reports on Acidity, by P. F. Wehmer; Water Resistance, by P. F. Codwise, and Grease Resistance, by R. C. Griffin.

Mr. Wehmer's paper, representing a report of the subcommittee on paper testing chemical methods, embodied detailed descriptions of four different methods of determining acidity in paper. These comprised the A.S.T.M. method of testing untreated insulating paper; the Kohler-Hall method; Doctor Minor's method, and a method of determining the hydrogen-ion concentration of a water extract of paper.

Water Resistance of Paper

The water penetration of paper was made the subject of a careful study by Philip F. Codwise, of the Certain-teed Products Corporation, in co-operation with different committee members. The dry indicator method in which DuPont N.E. grade and National Aniline and Chemical's two B.P. methyl violet are used, was recommended as an acceptable standard test. It was pointed out that the moisture content of the paper affected results. A mixture of finely divided dry sugar and the dyestuff, with which a small proportion of soluble starch is added, constitutes the finished indicator powder. The apparatus employed, preparation of the samples and method of conducting the test were described.

Grease Resistance of Paper

Roger C. Griffin, director of tests, Arthur D. Little, Inc., presented an exhaustive study of greaseproof papers and their resistance to penetration by turpentine and red oil. The sub-committee on grease resistance, of which Mr. Griffin is chairman, recommended a classification of greaseproof papers into groups, such as greaseproof, semi-greaseproof, grease-resisting, semi-grease-resisting, and non-grease-resisting, rather than the use of numerical results. It was recommended that paper should first be tested in a preliminary way by the turpentine penetration method, using four separate pieces, the paper to be tested by the red oil penetration method if the average result of the penetration by the preliminary test proved less than five minutes.

Determining Alpha Cellulose in Paper

A somewhat lengthy account was given by J. O. Burton, of the Brown Company, of means of determining the alpha cellulose content and copper number of paper, the report being written in collaboration with R. H. Rasch. A modified method has been adopted and applied to paper analysis. The principal modification consisted in the reduction of the paper to a fluffy cotton-like form by means of a mechanical disintegrator. This was found to be essential for accurate and uniform results. It was also deemed important to take into account the amounts of sizing and loading material carried by the paper. The alpha-cellulose method is patterned after that of Jentgen, with modifications suggested by Parsons and Ross. The copper number method was that of Braidy, with a few minor modifications.

Other papers, either presented in abstract or read by title, included The Volumetric Composition of Paper, by P. S. Billington; The Density of the Fiber Substances of Pulps and Paper, by P. S. Billington and E. L. Keller, and The Relation of Fiber Properties to Sheet Properties, by R. H. Doughty.

Work on Chrome Alloys

The Materials of Construction Committee, J. D. Miller, chairman, met with the Engineering Division in another room of the hotel, beginning at 2 p. m.

In opening the meeting Mr. Miller gave an outline of work accomplished and in prospect. The testing of ferrous and non-ferrous alloys had been continued, though reduced in volume as compared with the preceding year. It was expected to continue alloy testing under the conditions of the sulphite testing chamber. Work on the ferrous-non-ferrous alloy systems with sulphite acids would be considered in a paper to be presented at this meeting. He acknowledged fine co-operation from metallurgical companies and noted a contribution from the carbon industry, referring to a paper by J. A. Lee, of **Chemical & Metallurgical Engineering**, on the use of carbon fittings on paper machine dryers and as digester linings.

A general report was made by John F. Rhoades outlining the aims and scope of study of the committee represented in the Engineering Division.

Hard-faced Tools

One of the interesting papers presented at this meeting was by W. A. Wissler, of Union Carbide and Carbon Research Laboratories, Inc., on "Hard Facing in the Pulp and Paper Industry" which dealt with the results of an abrasive wear and methods of combating it. The hard facing process applies by welding methods to a tool or apparatus a coating or edge of an alloy that has been designed specifically to resist abrasive wear. The process could be applied to the alloy welding of chipper and shredder knives, and numerous other applications were mentioned, with illustrations from the industry. Hard facing effected economies, reduced maintenance costs and eliminated trouble. A graph was exhibited showing the relation between hardness and temperature for four ferrous and non-ferrous hard facing alloys. Hard facing is somewhat different from actual welding and it was necessary to instruct the operator on some important points to be observed.

Galvanic Action of Chrome Alloys

The paper by W. Andrew Wesley and F. L. LaQue on "The Galvanic Behavior of a Chromium-Nickel-Iron Alloy in Sulphite Liquors" constituted the report of a special study by research chemists and metallurgists of the International Nickel Company of the galvanic effects produced when certain metals and alloys are subjected to sulphite liquors and gases. It was noted that chromium iron nickel alloys are unacted upon by sulphite liquors except when the surface is abraded. Bronze was put in contact with the chromium nickel iron alloy both in the tower acid and reclaimed acid. The bronze was corroded to a marked extent in the reclaimed acid, which would indicate the presence of a depolarizer; the action was milder in tower acid where the valve bronze was coupled with the iron alloy.

Carbon Bricks for Digester Linings

The paper by James A. Lee on the reduction of corrosion by new construction materials has already been mentioned. This paper constituted a review of the literature and industrial returns. A novel suggestion in the paper was the use of carbon bricks as digester linings. While it was stated that complete carbon digester linings had not as yet been installed in any pulp mill, tests under accelerated and actual conditions had been favorable. The use of carbon fittings for blowpit linings, vomit stacks, sulphite liquor storage tanks and stock chests was also suggested, but it was difficult to gather from the paper if work on the use of this material had progressed beyond the experimental stage and the connection with actual operations seemed remote.

Progress in Stainless Steels

Progress in the use of corrosion-resistant alloys like the so called 18-8 alloy was interestingly set forth by John A. Mathews, of the Crucible Steel Company of America, in the introduction to his paper on "Two Years Progress in Corrosion Resistance." He recalled having discussed the subject at a

meeting held in the Waldorf-Astoria Hotel. On the site of this hotel had been built an 85-story building, which, with the addition of a mooring mast for dirigibles, gives the building a height equivalent to that of a 102-story building. The outside of the Empire State building is faced with some 300 tons of a chrome-iron alloy known as stainless steel. Within the period of two years, the automotive, petroleum, aviation, chemical and other important industries have made great progress in the use of similar alloys, and the pulp and paper industry has not been behind in the matter.

Mr. Mathews reminded his audience that the Crucible Steel Company of America had first produced steel of the 18-8 type in 1917, the general characteristics of this, and similar types of steel, being fully described by the company in 1921. The paper reviewed the causes of failures of 18-8 alloys, particularly in the sulphite industry and embodied metallurgical explanations of embrittlement and carbon precipitation. No subject in the steel industry has been studied so intensively during the past five or six years as corrosion-resistant metals and Mr. Mathews was confident that the actual use of these materials in industry had only begun.

Copper Piping for Paper Mills

A plea for the use of copper piping and fittings was made in a paper presented by Charles A. Hill, of the Mueller Brass Company, Port Huron, Mich., and Leland T. Summers, of the Port Huron Sulphite and Paper Company. One of the points made for the use of copper piping in white water systems was that the interior of copper pipes is always smooth from the fact that the metal does not corrode or rust and, as there is no anchorage for slime, slime spots are eliminated. The non-scaling quality of copper pipe adapts it for use in blowpits and screen rooms, as well as in stock lines conveying bleached as well as unbleached pulp. A comparison of costs of hard copper pipe with galvanized steel and wrought iron and brass pipe was given.

DIVISION MEETINGS, WEDNESDAY

Another series of meetings of divisions and committees took place on Wednesday, followed by a general session of the whole association in the afternoon.

Discussion of "Hydration" and "Freeness Testing"

The Operating Division met under the chairmanship of Fred C. Clark in the grand ballroom at 10 a. m., when Mr. Clark presented two papers on freeness testing, one entitled "The Development of Freeness Testers" by himself, and the other on "Hydration and Freeness," by F. L. Simons, of Skinner & Sherman, Inc. These papers, together with two others on "Classes of Color Used in Dyeing of Paper," by H. E. Pratt, of Pejepscot Paper Company, and "Practice and Control of Beating and Jordaning," by F. W. Motschman, respectively, were contributions by the Committee on Stuff Preparation.

Light on the Term "Hydration"

The papers on hydration and freeness testing read by Mr. Clark were of extraordinary interest as bearing upon subjects on which many paper mill men talk glibly, though with little apparent understanding of their properties or functions.

Mr. Simons pointed out that the terms "hydration" and "freeness" are rather indiscriminately used and have been the subject of much argument, misunderstanding and confusion. Despite voluminous contributions to the literature, no one appears to have taken the trouble to define "freeness" or "hydration" in simple terms and from the mill man's point of view.

Hydration as Understood by Chemists—In chemistry, the term hydration is used to designate the number of molecules of water taken up by a salt when it crystallizes from solution, the amount of water hydration being definite and unalterable. This is not the case with cellulose where there is no evidence of a definite compound being formed with water or of a fixed ratio of water to cellulose. In the ionic dissociation theory of chemistry, it is understood that positive and negative ions surround themselves with a loosely-bound "atmosphere" of water, which is termed water of hydration. Something of the same nature takes place when cellulose is dissolved in strong solutions of zinc chloride, or of calcium thiocyanate.

A Homely Example of Hydration—Mr. Simons gave a homely example to illustrate the ideas entertained by chemists of water atmospheres or envelopes. In making emulsions of water and red oil or oleic acid, it is customary to add a little caustic soda to a mixture of water and oil in equal parts. When this mixture is agitated or passed through a colloid mill, an emulsion results which appears perfectly homogeneous and may be called a solution. This solution consists of freely floating particles of oil surrounded by a film of sodium oleate. If the agitation is carried a step further, the oil droplets will be so small that they will be mostly soap film, and too much mechanical processing, as in a colloid mill, will result in an emulsion that is a solid gel.

The difference between cellulose and the colloidal materials mentioned, as well as the chemical salts previously referred to, was that the cellulose in paper is not a homogeneous material, and the "hydration" carried out in the paper mill is incomplete, points which are often overlooked by paper mill men in trying to describe "hydration." All of the foregoing is a good deal of a mystery and the matters of terminology and definition confusing to the mill man.

Gelatinization a Better Term—"Gelatinization," according to Mr. Simons, would be a better term to describe the progressive "sliming" or "slowing" of paper pulp, but it is too much of a mouthful and he thought it would be just as well to stick to hydration, and he offered the following definition of hydration as met with in paper mill work:

> "Hydration, as applied to paper pulp, designates that condition of the fibers wherein their outer layers are converted to a varying extent into a gelatinized, semi-plastic condition by the addition of water in some loosely bound form."

As a basis for further discussion, he considered this an improvement over the varying shades of opinion now prevailing, particularly if it would help to picture the outer gelatinous adhesive layers on pulp fibers during the beating. This gelatinous coating around each fiber might be considered the source of most of the bonding between fibers in a sheet of paper.

"Freeness" Another Loose Term—Mr. Simons took a crack at another term used in paper technology which is susceptible of many varying definitions. He referred to "freeness," though this term has become more definite of late owing to the development of freeness testers and refers to the arbitrary figure obtained with one or the other of the commonly used testers. He gave a very sensible explanation of the elusive change in feel and general character of stock that takes place in beating, due to a change in hydration and shortening of the fibers.

History of Freeness Testers

The paper by Fred C. Clark on "The Development of Freeness Testers" dealt also with "freeness" and "slowness" in terms of the operation of instruments for measuring this degree of beating. The first instrument of this kind was invented by Dr. Paul Klemm, of Gautsch, in Germany, called a sedimentation tester. This was patented in 1907 in association with Schopper, of Leipzig. Mr. Clark showed a drawing of the instrument and described its operation.

In 1910 Skark contributed an article to **Der Papier-Fabrikant** describing a new apparatus and a year later published details of improvements. Then in 1913, Alfred Schopper presented a paper at the annual meeting of the Verein der Zellstoff und Papier-Chemiker in Berlin on a beating tester, which afterwards became known as the Schopper-Riegel beating tester, the operation of which is now well-known. Mr. Clark exhibited a sectional view of the instrument and described its operation.

American Testers—The introduction of the Green tester, first described in **Paper** of February 23, 1916, was noted, followed by the Fishburn-Weber sedimentation tester, also described and illustrated in **Paper**, of October 11, 1916, as a paper presented at a meeting of the Technical Association of the Pulp and Paper Industry, September 29, 1916. Another form of sediment tester was described by "Snowshoe," in an article published in the **Pulp and Paper Magazine of Canada**, March 1, 1917. This tester was said to be similar to the Fishburn-Weber apparatus in construction, method of use and results.

Reference was also made to a paper by Otto Kress and G. C. McNaughton in which a so-called discharge tester of home-made construction was used. Then followed notes on the Canadian freeness tester, an outline view of which was shown, and the Williams tester, as well as the improved form of it called the 50-50 freeness tester.

The Newest Form of Tester—The latest development in freeness testers was attributed to Robert M. Boehm, of Masonite Corporation, Laurel, Miss. A description of this tester was published in the **Paper Trade Journal** of August 28, 1930.

Mr. Clark said that Boehm's work was of particular interest as he had explored an unchartered field concerned with the high end of the freeness scale, which was as conclusive as Green's was on the low end.

Important Points in Freeness Testing—Mr. Clark gave a useful summary of the development of freeness testers based on the foregoing references. He mentioned six points of prime importance in freeness testing, if accurate or even useful results were to be obtained, as follows:

Consistence of the water-stock mixture must be uniform.

A standard water temperature must be set and adhered to.

The water-stock mixture should be mixed under definite conditions.

The apparatus must be level.

The drainage must be started before the stock can begin to settle.

Details Often Overlooked—In using the divided funnel type of freeness testers some necessary details are often overlooked, Mr. Clark said. There was the question of uniformity of wire cloth or perforated plate used to separate the fiber from the outflowing water. Perforated plates present difficulties. To be effective they must have many fine holes, frequently 600 or more in each square inch. The most serious difficulty with the perforated plate was the rough or jagged edge left on one side of the plate. This rough side is required to be placed down so as to avoid catching fibers.

Details were given concerning the ratio of outflow of water from one orifice with respect to the other, as regards the different types of freeness testers in use.

Mr. Clark made the suggestion that the term "freeness" should be used as a measure of the side outlet discharge from the divided funnel, confining the term "slow," or "slowness," to some particular degree of freeness.

Discussion of Freeness Testers

The papers on freeness testing were discussed by George K. Spence, H. W. Richter, W. Boyd Campbell and D. S. Davis. Mr. Richter who is research chemist of George O. Jenkins, Bridgeport, Mass., spoke in praise of the Williams tester, saying that an important improvement in methods of freeness testing had been effected in it; it permitted a more definite measurement of the end point, which is difficult to do as the stock becomes slower. Mr. Campbell disagreed with Mr. Clark in deprecating the value of the sedimentation tester and said that the use of the English sheet testing machine provided an almost ideal type of sedimentation test. As to the consistence standard which had been brought up by Mr. Spence, and concerning which it had been stated that little or nothing was done about it, he said the figure that gave most concordant results with the use of the Canadian tester was three gm. Mr. Campbell called attention to an article which was contributed by him to the **Pulp and Paper Magazine of Canada** for March 1, in which he made a number of suggestions for bringing the freeness tester up to standard and keeping it at that state through the arrangement of a chamber designed to give a regular flow of water.

The paper on "Classes of Color Used in Dyeing Paper," by H. E. Pratt, was read by title, as was also a paper by F. W. Motschman on "Practice and Control of Beating and Jordaning."

Evaluation of Unbleached Pulps

The meeting of the Testing Division was scheduled to follow that of the Operating Division. The place of D. E. Cable, chairman of the Pulp Testing Committee, was taken by W. S. Woodson, Jr. The first paper presented was one "On Evaluation of Unbleached Pulps," by Warren F. Moore and William R. Willets. This was illustrated by a number of graphs and testing data showing results of tests on five unbleached sulphite pulps and two kraft pulps, tested by a modification of the T.A.P.P.I.—tentative beater method, disintegrated by a motor-driven stirrer, using a disk, instead of defibering by hand. A consistence of 1.75 per cent air-dry in the beater was preferred to the 2.5 per cent of the T.A.P.P.I. method; longer intervals for the removal of kraft samples were recommended.

Determination of Alpha Cellulose

A tentative standard method for the determination of alpha cellulose in pulps was proposed by Mr. Willets, in a separate paper. The procedure is essentially that of Method IV, American Chemical Society (**Ind. and Eng. Chem. Anal. Ed.** Vol. 1, No. 1, p. 54, January 15, 1929) with the following minor modifications: (1) The use of 95 per cent methyl or ethyl alcohol, followed by petrolic ether or other non-reacting volatile liquid, for washing the alpha cellulose after the final treatment with hot water was recommended to facilitate drying; (2) the determination of residual lignin (by the U. S. Forest Products Laboratory method) in the alpha cellulose was recommended for unbleached pulps.

A meeting of the Alkaline Pulping Committee under Chairman E. S. Hinman took place on Wednesday morning in one of the exhibition rooms of the hotel.

Two papers by members connected with the Forest Products Laboratory were on the program for this meeting and were presented in abstract form.

Estimating Soda Pulpwood

The Wood Testing Committee, W. H. Monsson, chairman, followed the Alkaline Pulp Committee and a paper of considerable merit on "Wood Evaluation for Soda Pulp Manufacture" was presented by H. W. Morgan, of the Oxford Paper Company. This paper had much to do with methods of checking the quality of the wood used in the manufacture of chemical pulps. Wood is still purchased without much definite knowledge of the amount of pulp it will yield. In the species used for soda pulp, the extent of decay and deterioration from the attacks of fungi is difficult to estimate. The alkali soluble test, in which two grams of wood is treated in a bottle containing 100 cc. of a one per cent solution of caustic soda was studied and changes in the method suggested. The one per cent alkali solubility was said to give a good index of the degree of loss resulting from decay in a given sample of aspen wood. It was stated that an increase of one per cent in the alkali-soluble material was accompanied by a decrease of three per cent by weight in the pulp yield.

Dr. Emil Heuser was among those who discussed the paper. He inquired if any attempt had been made to ascertain the composition of the alkaline extractive liquor and was answered in the negative.

Carl R. Blomstedt of the Bogalusa Paper Company, in a paper entitled "A Rapid Moisture Test for Wood," described the use of a Spencer electric oven which permits a rapid current of preheated air to be passed through the wood to be tested, after having been ground in a Wiley mill. Suction is applied to the oven by means of a four-inch Nash "Hytor." It was said that by this method a test could be completed in 10 to 15 minutes, and the method could be used with other materials, such as paper and pulp.

Heat and Power Subjects

A series of interesting papers was presented by the Heat and Power Committee of the Engineering Division. These included an account of the development of synchronous motors in the paper industry by D. R. Shoults, of the Westinghouse Electric and Manufacturing Company; Steam Turbines in Paper Mills, by R. G. Standerwick, of the General Electric Company; Burning Pulp Mill Refuse, by H. W. Beecher; Trend of Steam Pressures and Temperatures in the Paper Industry, by John Van Brunt, vice-president, Combustion Engineering Company; Mechanical Handling of Pulp Wood, by J. W. Boyd, Maine Electric Company.

H. S. Kimball's paper on the utilization of waste sulphite liquor for fuel gave details of a German process interpreted in terms of American practice. Calculations were based on the waste liquor of a 50-ton pulp mill and the cost of oper-

ation was given as based on an investment of approximately $30,000.

Pulpwood Rakes

Some of the papers listed on the program were not presented. The paper by James W. Boyd on mechanical handling of pulpwood with power rakes traversed the ground of a paper presented at the annual meeting of the American Pulp and Paper Mill Superintendents' Association in Philadelphia, last year, with somewhat fuller details and including an account of an apparatus in operation at the new plant of the Maine Seaboard Paper Company, Bucksport, Me. The earlier description was of the pulpwood rake used by the S. D. Warren Company at Cumberland Mills, Me., in which chain conveyors were employed. The Maine Seaboard Company uses a cable conveyor which is much superior to the other.

SECOND GENERAL SESSION OF T.A.P.P.I.

A general session of the association was held on Wednesday afternoon, with President Krimmel in the chair, when Joseph Rossman, of the U. S. Patent Office, Washington, gave a most interesting address on "What Patents Mean to the Paper Technologist." He told how patents began as a "racket," and some people believe they are still a "racket." The life of a patent is 17 years, after which it becomes public property. He said that copies of all granted patents are published by the Government and the Patent Office does a big business in them by selling copies to any one who desires them at ten cents each. About 2,000,000 U. S. patents are available.

Patents on Papermaking Process

The total number of patents issued from 1836 to 1930 on papermaking processes and apparatus was 4,523. A patent is not necessarily a warranty of its commercial success. The exclusive right to a patent means that the inventor has a right to go into a federal court of equity and ask it to prevent others from infringing his patent. The Government gives the inventor nothing which he did not have before except the right to fight others in court if he has the money.

The Vicissitudes of Inventors—Some of the interesting statements made by Mr. Rossman are worth reproduction. It will surely make budding inventors hesitate to be told that few individual inventors of basic inventions have directly prospered from their patents; for if their invention is valuable, they soon find themselves pirated by infringers and the only redress obtainable is by expensive court litigation. About $1,000,000 was spent in fighting the infringement of Edison's incandescent lamp. Edison, himself, has recently said that he spent more money in obtaining, litigating and preventing infringements of his patents than he received from them in profits. Dr. Reginald Fessenden, who has made many important radio inventions, also stated that he had not made a penny from his patents.

Patent Claims Important to Read—Notwithstanding the foregoing, Mr. Rossman expressed it as his belief that patents were of decided value to the paper industry. Patent claims, as appended to the specifications of a patent, often in voluminous fashion, are important to read, and to patent experts are the very heart of the patent. No paper technologist can afford to overlook or neglect them, as a patent stands or falls on its claims. These claims often appear to be repetitions or variations of each other couched in complicated phraseology which reads like Greek to everyone except the patent expert. Mr. Rossman said claims were the measure of the strength and value of a patent, all patent suits being brought on the basis of the claims, and that the drafting of claims was a fine art in itself, often requiring the adroitness of a metaphysician and the linguistic skill of the medieval scholastic. Claim drafting has some resemblance to solving a problem in geometry. What is known is given in the specification and in the prior art, so far as it is available. The claims must then be constructed, observing all the rules and decisions of patent office practice, as well as court decisions. Possible equivalents, infringements and attacks on validity must be reckoned with.

Early Sulphate Patents—Mr. Rossman compared the patent obtained by Eaton in 1871 covering the sulphate process with the Dahl patent issued in 1884 for the improvement of this process. Eaton's claim read "the use of the sulphide of sodium as a solvent in the treatment of wood, straw, or other vegetable fibers." Dahl's claim read: "The process of producing cellulose from wood or other vegetable matters by boiling the same under pressure in a watery or hydrated solution containing sulphate of soda, carbonate of soda, soda hydrate, and sodium sulphide." Notwithstanding his patent, Eaton could prevent Dahl from using it because Eaton's claim would be infringed by the use of sodium sulphide. At the same time Eaton could not use Dahl's process without infringing Dahl's claim, so that each would have to have a license from the other for the use of their respective processes. Why was Dahl granted a patent on his process? Because of the use of other chemicals and the claim of cooking the wood under pressure, which in the opinion of the Patent Office required invention and was not obvious, although Eaton disclosed the basic idea of using sodium sulphide.

Patents as Sources of Technical Information—One of the interesting observations made by Mr. Rossman in the early part of his address was that patent specifications represented publications of interest to the paper technologist as a mine of technical information, which is true.

Notwithstanding what was said by him about the weakness of patent holders' rights, Mr. Rossman did not hesitate to say that patent protection was without doubt one of the greatest incentives to the development of an industry, and many companies would not be justified in spending so much as they do at present on their engineering departments in their absence.

There was no discussion of the paper, and Chairman Krimmel announced that the remainder of the sitting would be occupied in hearing committee reports, after which round table conferences of committees and sub-committees would be held.

Plans of the Education Committee

H. G. Noyes, chairman of the Education Committee, set forth some of the projects on which the committee is engaged. He said that attempts were being made at a comprehensive study of the place of technically trained men in our industry. A questionnaire will be sent to every pulp and paper company served by the Technical Association to obtain data which can be used as a basis for working out a standard method or procedure to be followed in conducting an educational program for the industry. He enumerated the headings under which the questions would be put.

Mr. Noyes said that the Federal Board of Vocational Education, Washington, D. C., had been instrumental in assisting several major industries in educational programs and it was recommended that T.A.P.P.I. ask for similar assistance for the paper industry.

Proposed Loose Leaf Manual

L. C. Reynolds, chairman of the Management Methods Committee, discussed some of the plans of his committee. He advocated the publication of a standard manual of testing methods in a form which would permit of the insertion of addition and revisions as adopted, the idea being to use a loose-leaf device. The committee also advocated the establishment of a system of uniform cost accounting for the industry. Mr. Reynolds said that the Cost Department of the American Paper and Pulp Association had already made a start in the direction of formulating a system, and in this the moral assistance and aid of T.A.P.P.I. members would be very advantageous.

C. M. Baker, chairman of the Waste Committee, described some of the outstanding developments in white water utilization, speaking particularly of the practicability of developing a closed system involving the recirculation and reuse of the white water.

Investigations by the Engineering Division

John F. Rhoades, general chairman of the Engineering Division, discussed the reorganization of the committees during the past year, which, he said, had resulted in a more formulated and workable plan. Work during the year had consisted for the most part in investigation of advancements made in power plants, advantages gained in new equipment, and the uses of new alloy metals, ceramics, and other building materials. The committee recommended that more time must be allowed contributors of papers to properly arrange their papers and meetings for the best results. By proper

arrangement of general outlines of procedure, a more workable program could be taken readily by the new chairmen, and the proper records kept, so that unfinished work could be carried through to the following year. He announced that J. D. Miller, chairman of the Materials of Construction Committee, had a brief report to make.

Mr. Miller stated that his committee had continued the work of testing ferrous and non-ferrous alloys in the corrosion chambers of the three stations and expected to continue alloy testing. Further reference to this report is made in another part of our report of the meeting.

Report on Raw Material

J. L. Parsons, chairman of the Raw Materials Division announced a report by Arthur C. Dreshfield, of the Non-Fibrous Raw Materials Committee.

Mr. Dreshfield said that the committee was directing its efforts toward the study of the sources, manufacture, transportation, storage, application, properties and economics of all raw materials of pulp and paper manufacture of a non-fibrous nature, other than fuels and water. He gave the personnel of the committee and stated that a report had been prepared covering the advancement or progress during 1930 in the economics, and manufacturing and handling technique of 24 of the major raw materials, which would be presented as a separate report. In addition the committee had sponsored a paper by O. L. Cook on Lime and Limestone as well as a bibliography by R. T. Baldwin covering the use of chlorine as an agent to combat slime in paper mills.

Work on Paper Permanence

Dr. Jessie E. Minor, chairman of the Committee of Fibrous Raw Materials, was next heard from with a report of the committee, which dealt with the subject of paper permanency and outlined the scope of the work undertaken by the committee. The program for the current year was outlined in the report and included the study of such subjects as the relation of acidity test to the probable permanence of paper; the copper number determination and its relation to paper permanence; the viscosity of cuprammonium solution as a measure of fiber quality; the alpha content as a measure of fiber quality; the soda soluble test as a measure of halfstock or pulp quality; the value of artificial aging in predicting paper permanence, and a discussion of permanence from the standpoint of a paper user, the last named topic to be treated by H. M. Lydenberg, assistant director of New York Public Library.

Nature of Cellulose from Different Fibers—Miss Minor reviewed the literature of papermaking fibers. The idea prevailed at one time that fibers from different sources were fundamentally different in properties. Then gradually the scientific literature developed evidence that the fundamental unit cellulose material out of which all fibers are built gave similar reactions and was most probably identical in all types of fibers, including grasses, straws, wood, cotton and linen. This knowledge encouraged wood pulp manufacturers to increase their efforts to isolate cellulose material from the wood in a purer form and results have shown that the more the extraneous matter is removed from the wood fiber, the nearer the fiber approaches some of the properties of cotton which occurs in nature as almost pure cellulose.

Cellulose not Identical in All Fibers—Miss Minor said that more recent investigations had developed information which made it questionable as to whether fibers built from the same unit material are necessarily identical and whether identical qualities can be expected in papers made from different fibers. She instanced contributions from scientific laboratories which bore this out, and intimated that this evidence of different fiber structure would influence paper research of the future.

The subject of permanence standards for the paper industry was discussed in the report. Chemical tests were being studied but interpretations of results at present seemed too questionable and complicated for trade adoption.

Studies by the Alkaline Pulp Committee

E. S. Hinman, chairman of the Alkaline Pulping Methods Committee, reported on the work of the year, saying that the committee had made an effort to identify more fully and state more clearly the terms of the tentative standard method for sulphate recovery-room practice formulated at last year's meeting. The final draft had been submitted to the sulphate pulp mills for corrections, suggestions or acceptance. "Critical temperature" studies on long-leaf pine would be continued. Another subject of study suggested by the committee was the proper treatment of each of the various broad-leaf woods used in the soda process, such as poplar, gum, beech, birch, aspen and extracted chestnut chips. Attention would be paid particularly to temperature, pressure, length of cook, condition of wood, concentration of chemical, and reuse of black liquor in the digester.

Other Committee Reports

Joseph H. Slater reported briefly for the Mechanical Pulp Committee, touching on the progress made in the grinding of gummy woods.

E. G. Ham was called upon for a report for the Stuff Preparation Committee, and R. W. Pattison reported for L. M. Yoerg, chairman of the Paper Manufacture Committee, in which he stated that removable fourdriniers were coming into more general use, and announced a contribution by himself on paper machine felt operation and the factors affecting felt life.

E. O. Reed, chairman of the Testing Division, announced that his division consisted of four committees on Wood Testing, Paper Testing, Pulp Testing and Materials Testing.

Work of Paper Testing Committee

Chairman B. W. Scribner of the Paper Testing Committee reviewed the work of the past year. He said that an official method for testing bulk of paper and revision of the official method for fiber composition, paraffin and starch had been adopted by the association. The total number of T.A.P.P.I. official testing methods was now 27. The status of various development projects now under consideration by subcommittees were described and he discussed some general developments in paper testing, particularly as regards methods related to the determination of paper permanency. It is the idea of the committee to publish the official testing methods in looseleaf form so as to provide for the insertion of revisions and additions. Publication of separate prints of each method, on durable paper and of convenient size for the laboratory notebook, would no doubt be generally welcomed.

A progress report for the Pulp Testing Committee, D. E. Cable, chairman, was made by W. R. Willets, and Carleton E. Curran reported for the Division of Research and Development, giving a cross section of its activities.

Factors Affecting Paper Permanency

Another series of committee meetings took place on Thursday forenoon, the last day of the convention. The Fibrous Raw Materials Committee, of the Raw Materials Division, was convened by Dr. J. L. Parsons, chairman, who turned over the meeting to the chairmanship of Dr. Jessie E. Minor, who heads the Fibrous Materials Committee.

Acidity in Paper

Miss Minor gave abstracts of some of the work in which the committee had been engaged, much of it being her own. Thus she discussed acidity of paper and pH control. Papers made with excess alum in the beater developed acidity on aging. Attention had been given during the year to methods of determining the alpha content of pulps in its relation to paper permanence. A point brought out was that alpha content is a fiber quality and not a paper factor, and that in a wood paper which depends largely for its strength upon the cementing properties of the non-alpha portions of the fibers, neither the alpha content nor its permanence was any criterion of paper permanence. With a rag paper this was true to a lesser extent, since fibrillation entered more largely into its formation than was the case with wood papers.

Accelerated Aging of Paper—Accelerated aging as a test for paper permanence was discussed and some interesting facts brought out in regard to the influence of tub sizing and impure atmospheres on the preservation of papers. It was

stated that light aging in the visible spectrum had little effect on papers but the ultra-violet rays caused oxidation, brittleness and discoloration.

Paper for Etchers

As a contribution to the discussion of Miss Minor's report, W. G. Hendrich remarked that in talking with an etcher that morning he had been told that for etching reproductions a paper was used that was imported from Japan. This paper contained no rosin, which brought the statement from another member that Dard Hunter was making paper in his new mill at Lime Rock, Conn., an etcher's paper which contained neither rosin nor alum.

Cellulose Viscosity as Affecting Quality of Paper

General Chairman Parsons presented a paper, illustrated with curves, on the fluidity or viscosity of cellulose in cuprammonium hydroxide solution as a means of evaluating fiber quality. He had carried out a series of tests in the bleaching of a sulphite pulp requiring 4.6 per cent available chlorine, pulp samples being examined hourly during the experiment, when the progressive effect of the bleaching operation on fiber quality was observed. Details of the tests were given and the results summarized.

Librarian Lydenberg Discusses Poor Paper

H. M. Lydenberg, assistant director of the New York Public Library, held the interested attention of those in the room with an account of the efforts he had made to preserve books and files of newspapers in the library made of modern paper. The best means he had found was the use of Japanese tissue paper as a transparent covering. He said that all librarians were interested in paper permanency and he hoped that the chemists whom he was addressing would use their influence to urge on the sales force of mills not to sell paper on the basis of its cheapness, but on a quality basis. Salesmen should endeavor to ascertain what purpose the book or publication was to serve and supply a suitable paper. He would regret, of course, to see permanent papers used for the publication of certain trashy magazines. He appreciated the difficulty of answering for the permanency of a particular paper until one was familiar with the conditions to which the paper would be exposed—atmosphere, light, etc.

In reply to questions, Mr. Lydenberg told of the means taken to protect some books and newspapers by covering them with silk, Japanese tissue paper, and dipping the sheets in cellulose acetate solution, or such he supposed it was that the publishers of the Christian Science Monitor used, though he was not certain that it was cellulose acetate, the publishers being rather secretive about it.

Skeptical About Bookworms—Mr. Lydenberg is skeptical about the activities of bookworms in the destruction of paper. He admitted the existence of bookworms, for specimens had been sent to him and he had found it difficult to keep them alive; he thought they might not like New York. The best way to guard against the ravages of bookworms was to expose the volumes infested with them to sunlight and cold air.

General Chairman Parsons voiced the appreciation of all present for Mr. Lydenberg's interesting contribution to the proceedings.

Heat and Power Papers

The Engineering Division also met on Thursday morning, when papers were presented by members of the Heat and Power Committee. The chairman of this committee is John D. Rue. Among the papers discussed was one by N. H. Sandberg, of the Waldorf Paper Products Company, on "The Steam Accumulator in the Board Mill." This paper was available in preprint form, as were the other two: "Purchase of Electric Energy and Steam by Southern Paper Industry," by J. R. Lester and G. H. Finks, Albama Power Company; "Steam and Power Plant Location Factors," by J. F. Rhoades, Mead Corporation.

The paper by Mr. Rhoades constituted an analysis of three possible plant locations, the relative merits of each being considered in terms of fuel availability, water power, labor costs, building costs, purity of water, overhead, steam pressures, and general economics.

An All-Groundwood Paper Shown

At a meeting of the Acid Pulping Committee, L. E. Jonte, chairman, papers were to be given on developments in the sulphite pulping industry, represented by contributions of R. W. Hovey and A. D. Merrill, G. H. Chidester, and W. H. Swanson and W. L. McCabe, but none of these papers was available. At a meeting of the Mechanical Pulping Committee, O. L. E. Weber and W. J. Garding, of the Watab Paper Company, exhibited specimens of newsprint paper made entirely of groundwood pulp without admixture of sulphite.

LUNCHEON AND ELECTION OF OFFICERS

The annual luncheon of the Technical Association took place on Thursday afternoon. In the absence of President Krimmel, who was down with an attack of influenza, the chair was taken by R. H. Laftman who conducted the proceedings, following a business meeting at which officers to serve during the ensuing year were elected as follows:

Officers Elected

President—Maxamillian Krimmel, Hammermill Paper Company, Erie, Pa. (reelected).

Vice-president—Allen Abrams, Marathon Paper Mills Company, Rothschild, Wis.

Secretary-treasurer—Ronald G. Macdonald, New York.

Executive Committee—Maxamillian Krimmel, chairman; Allen Abrams, Grellet N. Collins, John S. Bates, R. Bell Irving, C. C. Heritage, W. O. Johnson, J. H. Slater, J. F. Rhoades.

The only changes in the Executive Committee consisted of the election of Grellet N. Collins and J. F. Rhoades as new members.

Progress of Technology

The first speaker at the exercises following the luncheon was Henry P. Carruth, executive vice-president of The Mead Corporation, one of the original members of the Technical Association, whose subject was "The Technician in the Paper Industry."

Mr. Carruth traced the beginnings of scientific methods and control in paper manufacture and outlined the steps leading to the formation of the Technical Association, which began in 1915 with a membership of 201 and had grown in the ensuing years to the present membership of 1,132. He regarded this growth as an indication of a tremendous expansion of technical talent applied to our industry, though it was undoubtedly true that it reflected only a part of that growth, since it was safe to assume that a large number of technicians now employed in the industry were not members of the association. Membership alone had, however, little true significance in determining the values created by this process of change. What was of more importance was the gradual change from an art to a science, which had been the real result. Mr. Carruth mentioned a few of the outstanding signs of progress. There had been radical developments in machine design, making for increased speed and improvement in methods of driving equipment. The newer mills are larger, better built and better designed than in the past, the attention given to convenience, sanitation and proper lighting being especially notable.

Unsolved Problems—Passing rapidly over detailed studies of equipment, raw material, power and products, he touched on some unsolved problems and spoke of "the awful waste of organic material which takes place in our chemical pulping operations." Much remains to be accomplished in solving the problem of cellulose chemistry. In agreement with certain other far-seeing people he looked forward to a time when the non-cellulose portion of the tree would be considered the major product and wood pulp the by-product.

Place of Technical Men in Management—Mr. Carruth spoke of the opportunity that presented itself for technically trained men assuming positions of management. "Under empirical conditions," said he, "management of industry could well be left in the hands of men not trained in science. But when industry becomes, as it is fast becoming, a complex of all the branches of science, then it seems obvious that it must be guided by men capable of understanding the work of their subordinates and associates."

He expressed it as his belief that the training and selection of men for executive positions was one of the major problems of the future. Mere engineering knowledge would not equip a man to fill an executive position. Special qualities of character and temperament were required, a knowledge of economics and psychology being of equal importance.

Future of the Paper Industry

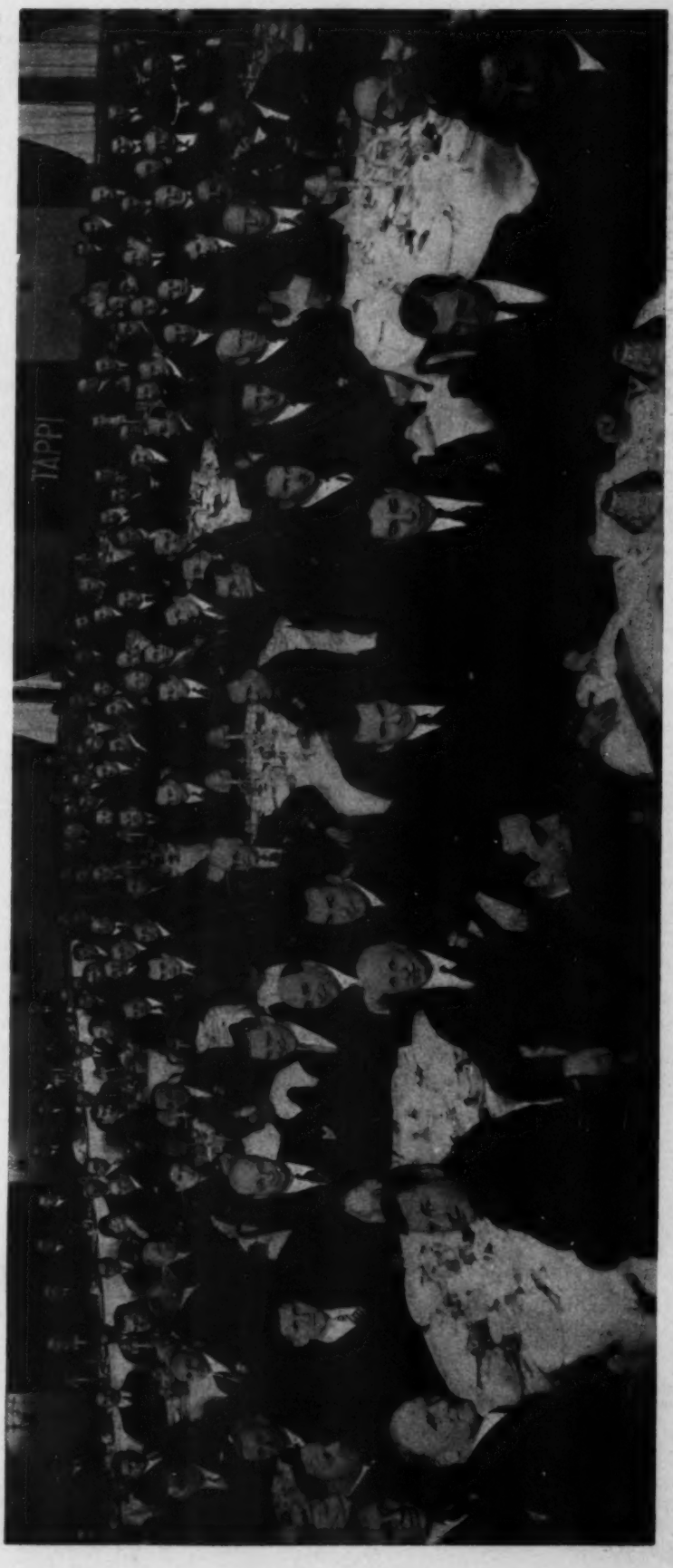
The next speaker was Dr. Gustavus J. Esselen, of Boston, who indulged a prospective view of research and development in the pulp and paper industry, in which the idea was put forth that cellulose fibers and the paper made from them might be supplanted at no distant date by a synthetic substitute. Doctor Esselen's address revealed much care and philosophical thought which will assure for it the earnest attention of serious students of the future of papermaking. He is an advocate of well directed, painstaking, persistent research, and if he spoke as a prophet it was with reservations. One prophecy which he gave at second hand was that, within the next ten years, paper would be replaced by material which does not depend upon the slow growth of trees for its production. The man who made this prediction originally had made others no less startling which had been fulfilled, and this one, in Doctor Esselen's opinion, was worth a second thought.

Synthetic Alcohol—The manufacture of so-called wood alcohol, known scientifically as methanol, from coke and steam by a synthetic process, cut into one of the large industries depending upon wood for its raw material. It was a rude awakening for an industry to discover in sudden fashion that its raw material was not so abundant and so cheap but that more advantageous substitutes could be found.

Doctor Esselen recalled how a tank ship appeared in New York harbor one day laden with wood alcohol or methanol made from coke and steam, and the cargo was sold readily at a price below what it cost to make the same material from wood. "In other words," said he, "this industry found that the economic status of its raw material did not afford it the security on which it had been depending, almost as a matter of course."

Warning of the Silk Industry—The lesson was that we in the paper industry cannot afford to sit back complacently and say that paper will always be made from wood. You must be careful to avoid the attitude of the silk industry when threatened with competition from rayon some 20 years ago, which appointed a committee to study the subject. This committee after months of careful study reported that the inherent difficulty involved in the production of the new problem was so great as to debar it from any real future. Yet today the world uses much more rayon than it does natural silk and the proportion is increasing.

The Search for Wood Substitutes—As regards the search for substitutes for wood as a raw material for paper, Doctor Esselen said there were two possible lines of approach, one of which involved the manufacture of paper from cellulose, derived from some source other than the



Picture taken at luncheon of the Technical Association of the Pulp and Paper Industry, February 19, 1931, at the Pennsylvania Hotel, New York City

slow growth of trees and the other on a process that did away entirely with cellulose as raw material and producing a synthetic paperlike material directly. He instanced the efforts of chemists in other directions such as the production of ethyl alcohol without the necessity of growing corn or of depending on any slow process of natural growth. The tendency in present-day chemical technology was to substitute direct synthetic processes for the longer processes of natural growth.

Turning to another aspect of the subject he spoke of the possibilities of making substitutes for paper from synthetic resins. He had already seen in the laboratory thin sheets which bore no chemical relation to cellulose yet which could be made to take printing. These sheets could be prepared by a simple process and they might prove to be one of the ways in which the prophecy already mentioned could be fulfilled.

The examples cited by Doctor Esselen were intended to illustrate the necessity for continued study and research, if the paper industry was to keep up with the march of progress.

Employment and Vocational Education

The last speaker was J. C. Wright, director of the Federal Board of Vocational Education, Washington, D. C., who is an old friend of the association, having assisted in the development of vocational education studies early in its existence.

Mr. Wright expressed the pleasure it afforded him to have a reunion with the Technical Association, and looking around the hall, he recognized and called by name a number of his former associates, or as he termed them, "old-timers." He complimented the association on the progress it had made in its constant effort toward the improvement and development of the industry. As to vocational education and employment in the paper industry, there were in every field of vocational training what might be called efficiency levels of employment, levels which rise in proportion as the amount of knowledge and skill required increases. The acquisition of such knowledge and skill takes time. Consequently, the amount of time provided for training in any given case must be determined by the amount of time required to train an individual to meet the given employment levels. He instanced a number of cases where vocational education had tended to relieve unemployment and spoke of the means taken in some industries to provide against the displacement of men by machinery, with the co-operation of the labor unions.

Power Week Activities Draw Large Attendance

Power Week was observed in Chicago from February 10 to 14, the interest of over 1,000 engineers and power specialists being centered on three important events. The Fifth Midwest Power Engineering Conference, sponsored and endorsed by the local sections of regional and professional divisions of engineers and power associations, held its sessions in co-ordination with those of the Fourth National Fuels Meetings, both having headquarters at the Stevens Hotel. The exhibit of the Midwest Power Show, held in conjunction with the Conference, displayed the products of more than 200 of the leading manufacturers of power equipment, and occupied practically all of the main floor of the Chicago Coliseum.

A goodly number of instructive papers were presented at the six technical sessions of the Power Conference. The opening address at the Power Economics Session Tuesday afternoon, treated the subject "Balancing Plant Investment with Operating Cost." Of exceptional interest was the Prime Movers Session on Wednesday, when papers were given on trends in the development of steam turbines, reciprocating engines, internal combustion engines and water turbines. The distribution of electric power was discussed at the Electrical Field Session. Important subjects taken up at the Water Problems of the Power Plant Session were, late developments in pretreatment of boiler feed water, and in evaporator practice and design, and concentration control of boiler water. The civil engineers held the final business session of the conference Thursday afternoon.

Luncheon meetings which proved both entertaining and instructive were held each day of the conference. At the Tuesday luncheon, the subject considered was, power and its effects on progress and civilization, while the Wednesday luncheon and program was given over to the American Institute of Mining and Metallurgical Engineers. The final gathering and chief social factor of the week was the banquet and ball, held at the Stevens Hotel on Thursday evening. This event was participated in by all those in attendance at both the Power Conference and the Fuels Division. An unusual entertainment feature was a series of tableaus presented during the dinner with a running story set to music, the sequences leading up to the topic of the evening, "The Electron-Midget Ruler of the Universe," by O. H. Caldwell, editor of "Electronics" and formerly federal radio commissioner for the Eastern District.

Plans Forming for Supers Annual Meeting

Preliminary arrangements are under way for the 12th annual meeting of the American Pulp and Paper Mill Superintendents Association, to be held at the Biltmore Hotel, Dayton, Ohio, June 4, 5 and 6.

General Chairman Tom Harvey has sent out an appeal for ideas and suggestions as to speakers and subjects in which the members are interested. Any suggestions should be addressed to Mr. Harvey, The Gardner & Harvey Co., Middletown, Ohio.

Worthington Annual Meeting

At the annual meeting of sales executives of the Worthington Pump and Machinery Corp., Harrison, N. J., February 9, H. C. Beaver, formerly executive vice-president of Rolls-Royce of America, was elected vice-president, his duties to consist principally of administration of the sales department. E. E. Yake was advanced to vice-president in charge of manufacturing and engineering.

This corporation has had a successful year, in spite of the economic conditions, having made 97 per cent of its sales quota. The quota was the same as that set for 1929.

New Fitchburg Corporation

In order to more efficiently care for a steadily increasing business, the Fitchburg Screen Plate Co., Fitchburg, Mass., previously wholly owned and operated by Walter S. Hall, has been incorporated under a Massachusetts charter. Several men, well-known to the pulp and paper trade, have become associated on the directorate of the new corporation and Bartow Crocker of Crocker, Burbank & Co. has been elected president.

The Fitchburg Screen Plate Co. has a modern foundry and plant with equipment to manufacture, not only its new type plate, but every kind and type of screen plate, flat or curved, used in the manufacture of paper or board.

The Morey Paper Mill Supply Co., Boston, with resident agents in Kalamazoo, Mich., Dayton, Ohio, Watertown and Oswega, New York will act as sole selling agents for the products of the new corporation.

Lockport Felt Stages Big Celebration

Friday, February 6, was a red letter day for the Lockport Felt Company, Newfane, N. Y., when 400 employees and their families, together with officers and executives of the company, united in an entertainment which set a record for the town and will long be remembered by all present.

There was indeed much occasion for celebrating, for this date marked the 40th anniversary of the incorporation of the firm, the 35th year of Joseph Robinson's service as superintendent and mill manager, the 25th anniversary of William H. Lee as secretary-treasurer and general manager of the company, and the dedication of the new 112 x 80 ft. addition to the weave room, which has just been completed.

This progressive company announces that it is installing the widest American made loom. Also that its labor turnover is negligible, with seldom the loss of an employee. An inventory of its personnel reveals that over 90 per cent of the employees have been with the company over ten years, the other ten per cent from 15 to 35 years.

A New Short-Center Flat Belt Drive

An important development in the power transmission field has been announced by The Rockwood Manufacturing Co., Indianapolis, Indiana (Division of General Fibre Products, Inc.) with the introduction of the Rockwood Short-Center Flat Belt Drive, now available in stock drives from 1 to 50 horsepower.

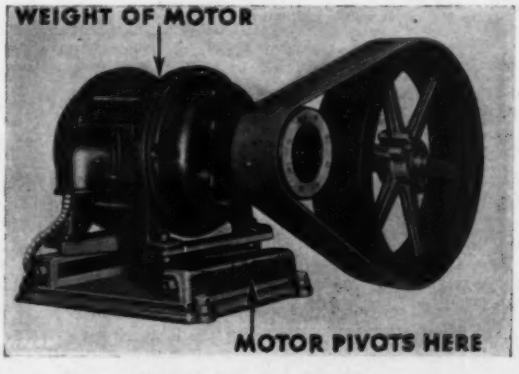
Realizing the need for an efficient and economical short-center drive of simple, practical design, Rockwood engineers

Standard Rockwood drive base

have devoted several years in developing and perfecting a modern, space-saving unit which has been thoroughly proved in a wide range of exacting machine applications.

The drive comprises a Rockwood motor base, two Rockwood Pulleys and a Rockwood-approved flat leather belt. The stock drives are designed for polyphase 60 cycle A. C. motors of any make.

This drive differs from other types, in that the motor is mounted on a free-swinging pivot. Automatically, the force of gravity—the weight of the motor—maintains uniform belt tension at all times. The correct belt tension, once established for any drive, is unchanged by belt stretch or by cen-



Rockwood drive complete

trifugal force. Thus uniform belt tension maintained by this simple method, assures constant pull and constant speed, resulting in full, uniform delivery of power at all times, with maximum efficiency.

The company's engineers point out that the pulling capacity of any belt drive is equal to the pressure exerted between the belt and the pulleys, multiplied by the value of the coefficient of friction between their surfaces; or translated into simpler terms, the amount of belt pull is proportionate to the tension in the belt and the amount of grip between the belt and pulley surfaces.

A high value of the coefficient of friction is assured by the manufacturer by the use of Rockwood pulleys and a special quality of approved flat leather belt. Consequently, a relatively low belt tension can be established—in fact, the minimum tension that is required to pull the load. The advantages of this method include maximum belt life and minimum strain on shaft bearings. When the drive is not in service, the belt is free to contract in length, thus permitting its fibers to recuperate. This greatly increases the efficiency and life of the belt.

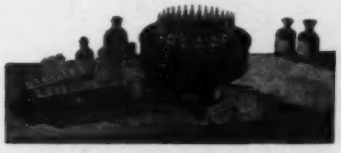
The adaptability of the drive is almost unlimited. The Rockwood base may be mounted on floor, wall or ceiling, to drive a single machine or a line-shaft group. The only restriction for any application is that the driven shaft shall not be lower than the motor shaft.

The company has issued a convenient specification and price book, which illustrates, describes and prices the complete line of stock drives. The specification data is arranged in a manner as to permit the selection and ordering of any size drive with remarkable ease.

LaMotte Develops New pH Control Unit

The research department of LaMotte Chemical Products Company, Baltimore, Md., has developed a new single indicator unit covering the range pH 3.0 to 10.5 which in design is a combination of the well-known LaMotte roulette and block comparator types merged into a smaller and more compact unit.

Color standards prepared from this indicator are supplied in intervals of 0.5 pH, so that readings are easily made with an accuracy of 0.25 pH. These color standards are placed in consecutive order in the inner revolving drum of the roulette, and readings are made by placing the sample under test directly in front of the standards. Readings are made



by viewing the color field through the eyepiece as the drum is rotated. When a color match is obtained with the sample under test, a reading is made directly from the label of the color standard. A daylight arrangement is provided so that the set may be used with consistent accuracy day or night. Errors due to turbidity or color in the sample under test are compensated for in these readings.

The case containing the marked test tubes and indicator solution is of the block comparator type, the top of which is used in making readings about the plant whenever desired. The color standards in the roulette drum are interchangeable with the block comparator.

The development of this utility pH outfit marks a definite step towards the simplification of indicator methods for practical plant control and it is not intended by the manufacturer that this outfit should replace the regular LaMotte indicator color standards which are made for work involving greater accuracy.

Worm Gear Reducers for Small Motor Drives

A series of three small worm gear speed reducers for small electric motor drives—up to seven horsepower capacity—have been developed by the W. A. Jones Foundry & Machine Co., 4401 W. Roosevelt road, Chicago, Illinois.

These small reducers are almost identical with the heavy duty Jones worm gear speed reducers except in size. The gear shaft—a high carbon steel forging—extends out on both sides of the housing so that machines can be driven from right or left hand side or both. A metal cap, or shaft guard, covers one shaft and is easily removed. Both the gear shaft and the worm shaft are mounted on Timken roller bearings.

Bulletin No. 49 gives complete information and simplified instructions for ordering the right machine. It will be sent on request.

G. D. Jenssen Company, New York City, has moved its offices from 200 Fifth Ave. to the Chrysler Building.

Armco Spiral Welded Pipe

As a result of closely observing the development of the pipe industry for the past several years, engineers of the American Rolling Mill Company, Middletown, Ohio, have developed Armco spiral welded pipe.

Among the favorable features claimed for this new pipe is the lighter weight, easier handling, long sections which reduce the number of field joints, smooth inside wall which reduces friction and pumping costs, and, of course, a saving in shipping and handling costs.

Armco spiral welded pipe is manufactured in jointless lengths up to 40 feet. Every joint is round, straight, smooth inside and light in weight. There are no interior grooves nor ridges to catch sediment or debris, or increase friction. Every ounce of metal is used to form the side walls; there are no projecting bands nor seams to add non-utilized weight. It is especially easy to weld, and can be used with any of the standard couplings.

Armco is now supplying this pipe in sizes ranging from six inches to 24 inches in diameter, in any wall thickness from 12 gauge to ¼ or ⅜ inch. It can be furnished with any type of coating desired—mill coat, asphalt inside and out, or galvanized.

A modern pipe manufacturing plant has been established in Armco's central works at Middletown, Ohio,—the original sheet mill plant of the company.

New Flexi-Unit Pumps Developed by Goulds

A new line of centrifugal pumps which offers 150 different pumping combinations, from a stock of 11 standard pump units and nine universal bedplates has been brought on the market by Goulds Pumps, Incorporated, Seneca Falls, New York.

The universal bedplates of these new Flexi-Unit pumps simplify the mounting of any size motors, from ¼ to 50 horsepower, with speeds from 1,450 to 3,450 r.p.m.

The standard pump units with changeable impellers assure capacities from 10 to 1,100 gallons per minute, at heads up to 350 feet.

The development of the Flexi-Unit line, enables mill supply houses and equipment distributors to furnish a high efficiency, motor driven centrifugal pump from a limited stock, without the long delay occasional by the average built-to-order, factory pump job.

The Chain Belt Company, Milwaukee, Wis., announces a change in the personnel of its Cleveland, Buffalo and St. Louis offices. Mr. Smallshaw, formerly in charge at the St. Louis office took charge of the Cleveland office January 1. Thomas Cocker, manager of the Cleveland office, has been transferred to the Buffalo office, and January 15 took over the manager's duties at Buffalo. Frank Gary has been transferred from the Buffalo office to St. Louis.

New Catalogues, Books and Publications

American Paper Machinery & Engr. Works, Glens Falls, N. Y.—This company now has for distribution a catalogue featuring its new Apmew pulp screen. Interesting records of savings effected in some mills with these screens are included with illustrations; there is a complete description of the screen and its performance, as well as photos and drawings. Space is also devoted to a description and brief mention of other Apmew equipment is featured. Copies on request.

Boiler Engineering Co., Newark, N. J.—All owners and operators of water tube boilers will be interested in a new six-page folder on the Beco-Turner Baffle Wall, which is the first publication sent out by this company since its affiliation with the Pilbrico Jointless Firebrick Co., Chicago. The bulletin is well illustrated with applications of baffle walls to all types of water tube boilers, and contains much valuable information. Copies on request.

The Bristol Company, Waterbury, Conn.—A new catalogue No. 4,000, Bristol's Air Operated Controller Equipment has just been issued in three sections: (1) Instrument; (2) Valves, and (3) Accessories. Complete information on the equipment covered in these sections is included together with instructive diagrams, drawings and tables.

Brown Instrument Company, Philadelphia, Pa.—An attractive broadside in colors, raises the question as to who gets the steam in a manufacturing establishment, and answers that question by showing just how this company's flow meter not only records the rate of flow changes, but shows just how many pounds of steam, gallons of water, etc., are delivered at any time day or night, furnishing a receipt for every pound of steam. A new catalogue No. 3004 describes Brown Electric CO_2 Meters, an instrument which records the percentage of CO_2 present in flue gases.

Hoffman Combustion Engineering Co., Detroit, Mich.—Firite Stokers is the title of a new illustrated catalogue just published by this company, which illustrates the stoker installation in the plant of the Beveridge Paper Company, as well as installations in other industries. There are also several suggested layouts with various types of boilers from 70 to 700 hp.

Link-Belt Company, Chicago—The annual report of this company has been issued from the Chicago office February 18, shows the volume of business for the year 1930 to be 77 per cent of that of 1929, with earnings per common share of $2.89. The stability of the company is reflected in this report, and its stockholders are promised a continuation of its policy of conservative expenditures.

The most recent issue of **"Link Belt News"** is one meriting special mention. This number has been published as a rotogravure edition, regular news supplement size of eight pages. The illustrations are all interesting installations of Link Belt equipment, photos of the various plants and the company's management. Copies to plant department heads upon request.

Mine and Smelter Supply Co., Denver, Colo.—A new catalogue just issued, is descriptive of the Heuser Laboratory Precision Balances which are extensively used in chemical and metallurgical laboratories. Each type of balance is illustrated and its particular features of design explained, with full dimensions, sensitivity, period of oscillation and price. There are a number of important suggestions for the equipment of a well lighted balance room.

National Regulator Co., Chicago—This company, manufacturer of A-Jacks Steam-Damper Regulators which are well-known to many power plant engineers, has developed A-Jacks Over-Fire Control, which is designed to maintain furnace pressure of individual boilers at the point of maximum combustion efficiency. The operation of both of these controls is described with illustrations in a new bulletin just published. A few typical installation hook-ups are shown, and the company will gladly answer inquiries or furnish copies of the bulletin on request.

Oliver United Filters, Inc., New York City—Bulletin No. 302 features filtration accessories available through this company, such as centrifugal, acid and vacuum pumps, air compressors, regulating valves, strainers, filter cloths, speed reducers, etc. The construction of these accessories is well brought out and suggestions made for their application. There are a number of illustrations and sectional drawings.

J. O. Ross Engineering Corp., New York City—Bulletin No. 17 describes and illustrates the Ross Paper Machine Hood, and contains pictures of a number of installations. That papermakers are fast realizing the necessity of installing hoods over paper machines, is evidenced by the number of modern mills that are listed in this bulletin, showing the number of installations that have been made in each.

United Conveyor Corp., Chicago—This company has developed basically new principles for utilizing the pipe line for ash conveying and its new system is called the Nuveyor. A new catalogue describes, illustrates and sets forth the advantages of this new development in the field of heavy duty, pneumatic conveying. An interesting double page diagram shows a layout of the system as installed in a prominent pulp and paper mill in Pennsylvania.

Worthington Pump & Machinery Corp., Harrison, N. J.—Recent literature put out by this company: No. S-500-B5, covering Diesel Engines, vertical four-cycle, direct-injection, Type B; W-112-S6, Horizontal Duplex Piston Pumps; W-112-S9, Horizontal Duplex Piston Pattern Hot Oil Pumps, and D-423-S9, Power Pumps. The company has also issued in book form its 15th Annual Report for the year ended December 31, 1930.

BOOK REVIEWS

The Modern Steam Turbine—By E. A. Kraft. Profusely illustrated, 202 pages, 7½ x 10⅝ in. Published by Vdi-Verlag G.M.B.H. Berlin NW 7.

Here is a book, right up-to-date, which must meet a long-felt want of many operating engineers. The book short-circuits the theory or general design of the steam turbine, which has been covered so thoroughly by Spodola. It confines itself to the latest tendencies in turbine construction, a very great number of examples of actual turbines being given. The cross-sectional drawings are exceptionally good and instructive to the operating and designing engineer. Although strictly a European book, American practice is covered more than one might ordinarily expect. Perhaps a better idea can be obtained of this exceptionally interesting book by mentioning the fact that 67 pages are devoted to the major subject of "Methods of Attaining Higher Efficiencies" which is again divided into two subjects, one upon the preparation of turbine schemes which covers this subject in from five different aspects and design which covers one by one the steam path, quality figure, method of expansion, nozzles, moving blade, casings, glands, bearings, rotors, governing. Another chapter of 17 pages discusses the technical factors limiting the design. The principles of design are briefly touched upon while the practical applications of the principles of design are more fully covered, requiring 73 pages. One chapter is devoted to condensers and their auxiliaries, a chapter of particular interest because of the very large number of different condensers which are shown and discussed. This book can be read to advantage by everyone responsible for turbine operation and is to be commended to the men who strive for higher efficiency and who want to know more fully the whys and wherefores of what is "inside the case."

POWER

GENERATION - UTILIZATION - MAINTENANCE

By W. S. JOULE

This section turns the searchlight upon power and its allied problems. It shows up big possibilities to save. Opportunities to improve conditions, methods, apparatus will be discovered. Worth while practices suggest new ideas and wider usages of equipment.

Precautions for the Inspection of Penstocks

WITH the approach of spring, many outdoor inspections and repairs will be made. One of the most important inspections to be made around a hydro-electric plant is the penstock. Penstocks above ground and so exposed to the elements should be inspected regularly both inside and out. Moreover, they should be thoroughly painted both inside and outside. Although frequently this precaution is omitted, any steel penstock should be given a thorough internal inspection every two years—and once a year if a shutdown can be tolerated.

Because of the dangerous rises of pressure that may occur, the external inspection of a penstock should cover particularly the condition of the anchors, signs of rust, any misalignment, the movement of expansion joints and any sign of leakage.

Where a penstock is to be emptied, or filled, the work should be done slowly so as to avoid any unnecessary pressures. Some companies make it a practice to empty the penstocks at night as temperature changes are then the minimum. It is important at such times to watch the air valves to make sure that they are functioning properly as the penstock empties, otherwise the penstock may collapse from atmospheric pressure. Leaky air valves may cause considerable trouble, especially if entrained water should freeze. The spring is a good time to replace the packing in the expansion gland nuts, which should be tight enough to prevent leakage but no tighter. How often this packing should be renewed depends, of course, upon the temperature conditions, which determine the amount of movement of the penstock, hence the wear of the packing.

Internal inspection of penstocks is necessarily a dangerous undertaking because of the possibility of water being turned into it while men are inside. The same precautions should be taken, therefore, that are employed in connection with high voltage transmission lines. Head gates controls should be closed and blocked so that they cannot be opened unintentionally nor by anyone except the one authorized to have the key. Notices should be posted saying, "men working inside" or similar warnings. The work should be delegated to some man and the number of men entering the penstock should be known and before water is turned on, all men entering the penstock should report outside. Sudden increase in load and demand for power sometimes tends to hasten the work of filling the penstock after getting the men out. This is where accidents occur. A number of accidents have occurred from time to time not only in penstocks but in long tunnels by which men have been carried to their deaths, sometimes because of undue hurry and haste and in other cases because of divided authority and lack of proper procedure. It is also important, of course, that all tools and equipment be removed before water is turned on again as serious damage may be done otherwise. A record of tools should be made, therefore, before anything is taken into the penstock and a careful check made when the men come out, to make sure that all equipment has been brought out.

It may appear that undue stress has been placed upon safety. It must be borne in mind, however, that some penstocks are one mile or more in length and where these are to be painted, it is necessary to employ a considerable number of men in order to do the job within the time permissible. The greater the number of men, the greater the possibility of one or more of them being left behind, hence the great importance of checking the men in and checking them out.

To Get the Most Out of Paint

VERY large users of paint, such as the railroads, public utilities, etc., make an extensive check of paint by applying different paints to various types of surfaces and then subjecting them to extensive tests outdoors and under other conditions so as to determine which paint stands up longest. For the majority of paint users, however, such a method is not practical and they are forced to either purchase paint by specification or to take the manufacturers' recommendation. This latter is probably the best way, provided that first-class paint manufacturers are consulted. The most expensive paint is not always the most desirable one, however. The average operating and maintenance engineer is more interested in what a paint will do, how it will stand up in service and how it will look than he is in its composition.

For service around paper and pulp mills, paints fall into four distinct classes, namely, for structural steel, for underwater exposure, for woods, and for brick, concrete and plaster. Paints falling into any one of these classes will meet practically every requirement of paper and pulp mills.

Where steel structures have to be repainted, the cost of brushing, scraping and cleaning the steel so as to remove rust, because the original priming coat has failed, will often exceed the total cost of repainting. Consequently, it is good economy to repaint before rust and corrosion can set in. The original priming paint, sometimes called the shop coat, is really more important than any subsequent paintings and the original cleaning to remove rust, mill scale and grease are important factors in determining how often repainting is required. In choosing the priming paint, it is important to decide whether it must be rust-prohibitive, rust-stimulating or inert, the usual rust-prohibitive being red lead, zinc chromate, lead chromate and blue lead. Rust-stimulative treatments usually used are the carbonateous materials, acid treatment or other materials electrolytically negative or cathodic with respect to iron. The inert materials generally used are the natural graphites, certain grades of iron oxide, silica, clay, asbestine and barytes. Linseed oil is the usual vehicle used athough manhaden, soya-bean and other oils may be used in conjunction or combination with it. For general purposes, a good quality of linseed oil and red lead make the best primer; and the best grade will cover possibly 700 or even 800 sq. ft. per gallon where the surface is smooth, clean and non-porous. Litharge is usually added to paint using red lead and linseed oil, as its presence improves the service. Care must be taken, however, not to add too much litharge, otherwise, brushing difficulties are immediately introduced, as the paint tends to grow ropy. Probably 5 per cent litharge will be found to answer the average purpose best.

For the second coat, the same paint can be used, although iron oxide is also used quite extensively. Frequently, a longer life can be obtained by mixing equal parts of the priming and the finished paint. By adding a little turpentine to the mixture, a better bond seems to be obtained.

For the finish coating, the choice of paint is usually a com-

promise between long life and appearance. Where long life is the prime requirement, natural graphite of good quality mixed into a paint with linseed and about 20 per cent by weight of volatile and drier in the vehicle will give a good finish with long life.

While bituminous materials, china wood oil paint and varnish base vehicles are usually employed for underwater exposure, linseed oil and red lead paint with a finish coat having about 10 per cent litharge added at the time of application often gives good performance. The use of red lead for the priming coat and emulsified asphaltum applied as a heavy finish coat will frequently give good results. The asphalt should be applied very thick, however.

Where it is impossible to experiment and determine the life of paint, the best results can be obtained by putting the problem directly up to reputable paint manufacturers. Since all paints of any specific class are made from much the same materials, it follows that a cheap paint will usually be found to be made from cheaper ingredients. From this it follows that it does not pay to buy the cheapest nor, possibly, the most expensive.

Keeping Tab on Stand-by Boiler Losses

IN order to lessen the stand-by losses, the first thing to be done is to determine how great these losses are. The next thing is to determine, if possible, what various losses comprise the whole. The first thing to know, therefore, is how much coal is used by each boiler "as is," so that the benefits of adjustment, overhauling and repairs may be made apparent.

One company took records of its boiler stand-by losses on a special report sheet. It knew just how much coal was used by each boiler and exactly how many hours each boiler was banked. It knew exactly how much coal was used per boiler horsepower per hour. After obtaining these facts, it set about studying the problem to find out what could be accomplished in the way of coal saving.

Is the amount of coal used for banking a boiler worth bothering about? A 600-hp. boiler banked for 24 hours will use from 3,000 to 4,000 lb. of coal. Where the setting is not tight, where the breeching damper is warped or will not close, and where the ashpit is not tight, this coal consumption may be materially increased. It may be double the figures given. While the actual coal consumption per hour per sq. ft. of grate surface under good conditions may vary between 1.25 to 1.50 lb. per sq. ft. of grate surface per hour, for the sake of emphasizing the importance of this matter, assume that 1.75 lb. per sq. ft. of grate surface per hr. is used for banking. Then go ahead and experiment and see how much this can be reduced.

Many aspects of fuel saving in the boiler room call for eternal watchfulness and alertness. Fuel savings during banking, when once made, "stay put" for a considerable length of time provided that common, everyday carefulness is given to the matter. Check up the fuel consumption for banking your fires and see to what extent the fuel consumption may be reduced.

Analysis of Turbine Outage

STEAM turbines are notoriously dependable and reliable. It seems more than probable, however, that because such a large percentage of steam turbines are operating under central station and public service operating conditions that such a small per cent of outage occurs. In central station service, the manufacture of power is the product which is sold whereas in various industries, the production of power is merely a means to an end, hence less attention is usually given to the prime movers. As applying to central station conditions, the report of the N. E. L. A. covering steam turbines during 1929 is of general interest to operators of steam turbines. It was found that under normal conditions, the annual inspection and adjustment caused the greatest outage. Of 156 turbines subjected to an annual inspection, the time was 387 hours, although the average hours required for inspection will vary quite widely upon the capacity of the machine and the age of the turbine.

The marked improvement in bucket and blade design is well shown by the fact that bucket and blade troubles decreased from 47 per cent of those reported during the year of 1925 to 18 per cent in 1929. The time of outage per unit dropped from 440 hours in 1928 to 294 hours in 1929, a decrease of 33 per cent.

Condensers still continue to give almost twice as much trouble as the generators, but still about half as much trouble as the turbines. The various causes of condenser outage was found to be as follows:

	Per Cent of Outage Hours
Cleaning	75.86
Leakage	6.44
Tubes	6.16
Shell	0.66
Circulating pumps	4.01
Condensate pumps	1.20
Air pumps	1.20
Miscellaneous	4.47
Total, repair and maintenance	100.00

As is to be expected, after allowing for the outage due to annual inspection and cleaning, field windings were the major single cause of generator outage as shown by the following causes of generator outage:

Generator Outage Hours

	Per Cent of Outage Hours
Vibration	3.03
Oil leakage	1.94
Armature core	5.07
Armature windings	6.06
Field windings	15.93
Exciter	3.04
Annual inspection and cleaning	36.42
Miscellaneous	28.51
Total for repair and maintenance	100.00

The various causes contributing to outage of 156 steam turbines were found to be as follows:

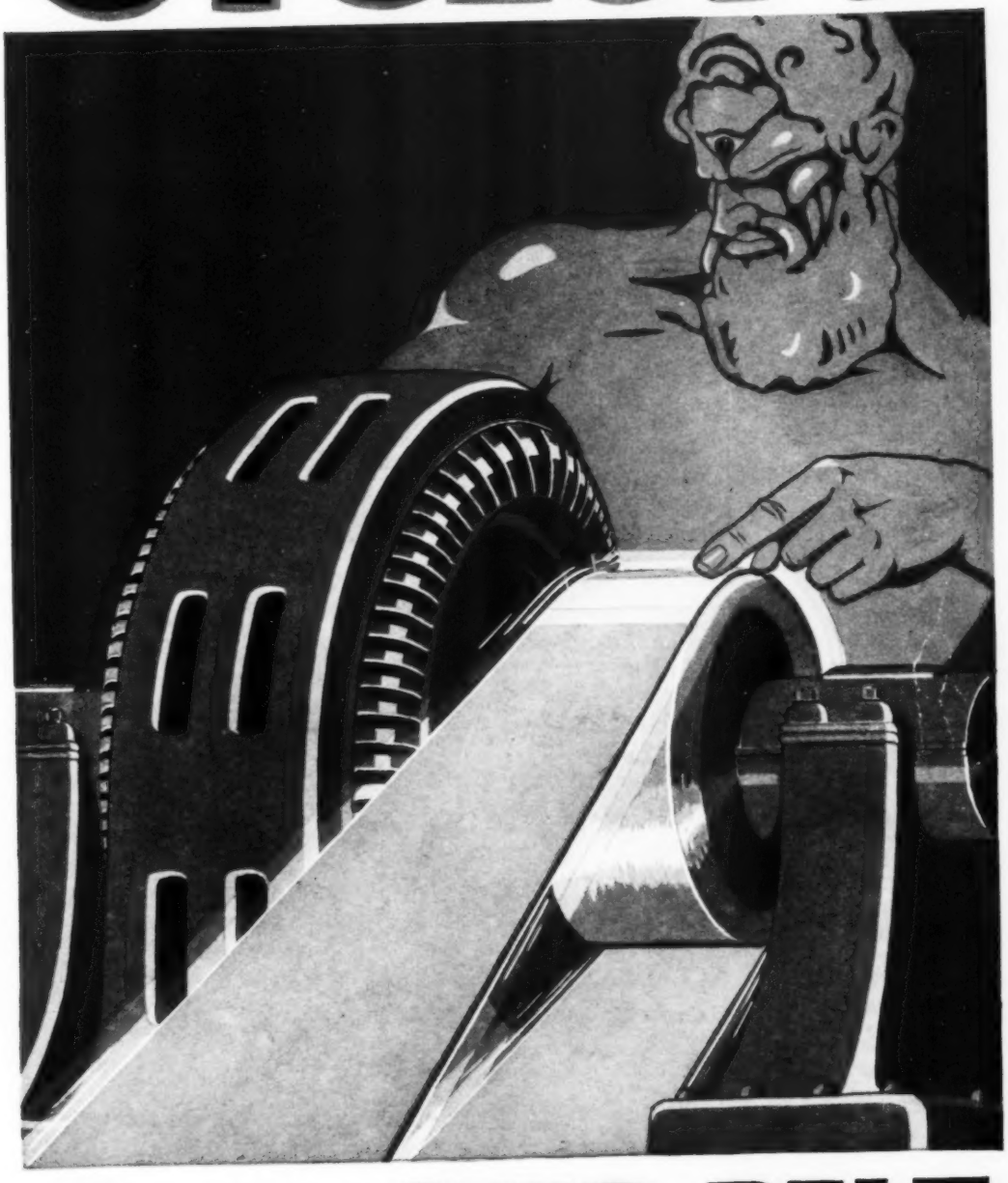
	Per Cent of Outage Hours
Steam casing	1.18
Governors	1.33
Control gear	3.44
Shaft packing	1.83
Nozzles and diaphragms	1.49
Shaft	0.29
Wheels or spindle	5.95
Buckets or blades	12.20
Vibration	1.48
Bearings	2.42
Lubrication system	2.28
Cleaning oil system	3.17
Annual inspection and adjustment	54.73
Miscellaneous	8.21
Total for repair and maintenance	100.00

Seventeen turbo-generators operating at 550 lb. pressure or above were found to have an outage factor of 4.76 per cent in 1929 compared with one of 14.75 per cent in 1925, notwithstanding the fact that they operated at 16.5 per cent more hours.

Where a boiler is to be laid-up for a short time, say, for example, for one to three months, the boiler can be kept wet on the inner side of the heating surfaces; if for longer periods it should be kept scrupulously dry.

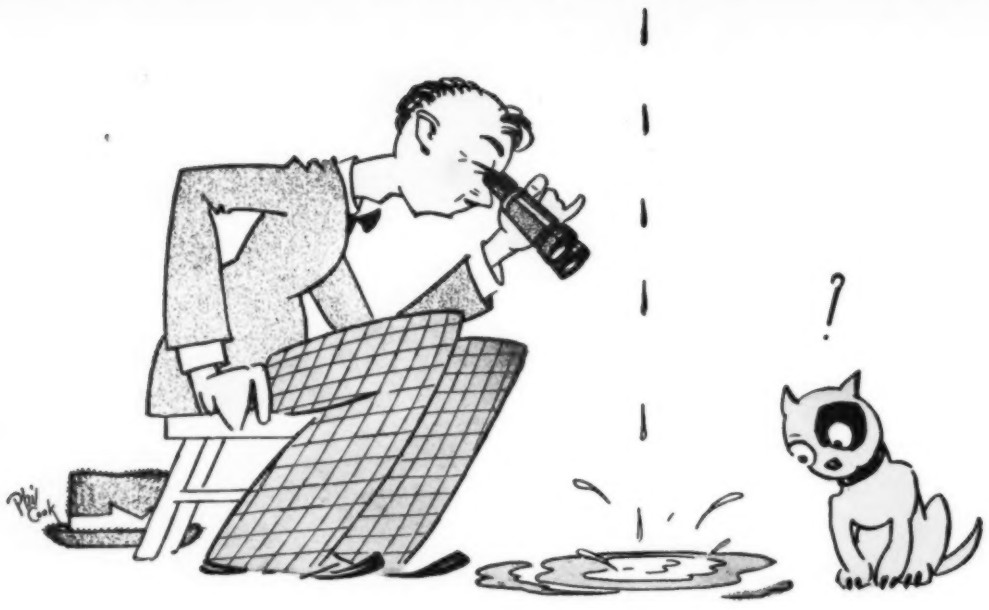
American Railway Engineers Association has set a value of 13 cents on each pound of scale forming solid removed from water. One of the chief causes of wasted fuel, untreated water is also responsible for tube failures, foaming, priming, necessity for taking out a boiler for washing, etc., and many other incidental expenses. It is often the one item that determines when the boiler must be shut down and at the same time how high a rating it can be operated at safely. Treated water pays big dividends.

CYCLOPS



The MASTER-BELT OF INDUSTRY

BOSTON WOVEN HOSE & RUBBER CO.
CAMBRIDGE MASSACHUSETTS, U.S.A.



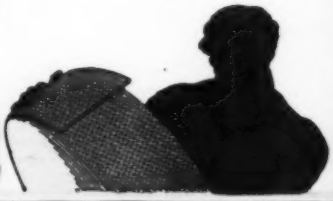
Watch the small leaks!

IT ONLY requires a few minutes to take up a belt, but if it has to be done very often the lost minutes can be translated into terms of lost production. And stretched, loosely-running belts are wasting power constantly by failing to deliver the full power-load. The sum total of all the little leaks in a year's operation might run into staggering figures if they could be computed.

¶ Cyclops belting overcomes this wasteful and troublesome feature by absorbing and neutralizing the strains which cause ordinary belts to stretch and stay stretched. The spring-like weave of the fabric enables Cyclops to smooth out the uneven power-load by equalizing the tension throughout its entire length.

¶ A comparatively small item may be a source of considerable loss or appreciable economy in power transmission.

¶ Watch the small leaks or they may soon become big ones!



CYCLOPS BELTING

A product of **THE BOSTON WOVEN HOSE AND RUBBER CO.**
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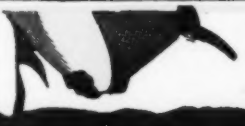
"The only real advance in transmission belting in twenty-five years"



Pacific Coast Safety Conference

Powell River Company Host at Inspiring Second Annual Event—Contemporary with Consummation of Company's New Development Program

ON Friday, February 27, the Second Annual Safety Conference of Pacific Coast pulp and paper mills convened at Powell River, B. C., under the chairmanship of Mr. R. H. Scanlon of Powell River, regional director for the National Safety Council. The conference was one of the most enthusiastic ever held in Powell River. Two thirds of the coast mills were represented, and the attendance was nearly double the number who gathered at the inaugural convention last year. The Powell River Company was again host to the visitors, who, from the moment of their arrival in the early morning, until their departure on the midnight boat, were occupied with a continuous round of entertainment and business.

Inspect Powell River Company's New Developments

The date of the conference coincided with the consummation of the Powell River Company's $8,000,000 expansion, which has been under construction for the past year. To the delegates, practically all of whom were representatives of the paper industry, the opportunity of inspecting the new development gave an added interest to the day's proceedings. The morning and a portion of the afternoon was devoted to inspection of the new work. At Powell River, the company's seventh newsprint machine, embodying the latest improvements in paper machine engineering, was on its best behavior for the visitors. The new grinder room, with its 16 grinders, operated by 3,600 hp. synchronous motors, was another attractive rendezvous for the visitors. The new safety devices, a distinguishing feature of all recent installations in Powell River, were keenly noted by the delegates. All the latest additions were in full operation and provided the visitors with an enjoyable and instructive two hour's tour.

At 11 a. m. cars were on hand to drive the party out to Lois River, where the company's new hydroelectric project has now been completed. The entire trip was full of interest and as one delegate expressed it, was "an appetizer for the main business of the conference." The entire penstock line, the 5,800-foot concrete lined tunnel and the temporary log crib dam were carefully inspected. Of special interest was the big 315-foot surge tank and the new power house at Stillwater, where the first 18,000 kv. a. generator is ready for operation. A special luncheon was prepared for the visitors in Camp I, headquarters of Stuart Cameron Co., contractor on the Powell River Company's new construction work.

THE AFTERNOON SESSION

At 2:45 the delegates returned to Powell River for the principal gathering of the conference. The subject of safety being of vital interest to everyone in the townsite, the doors of Dwight Hall were thrown open to the public, which almost filled the big auditorium. Several well-known speakers were in attendance and the safety question was covered from several different angles.

The increased attendance at this year's conference testified to the growing interest of Pacific Coast mills in the safety movement. It is significant also that the first attempt of western industry to come together on the subject of safety, was initiated by the pulp and paper industry. When Mr.

Delegates to the Powell River Safety Conference, photographed at the old logging railroad at Stillwater, are preparing to start out on their inspection tour of the Lois River hydroelectric development, just completed by the Powell River Company. They were driven "up the line" on the old logging locie, which had been specially fitted up for their reception

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MUNISING PAPER

R. H. Scanlon was appointed Regional Director for the National Safety Council in the West, there had never in the history of Pacific Coast industry, been a conference of mills called for the sole purpose of discussing industrial safety. In this field, as in many other phases of welfare work, the pulp and paper industry are pioneering the field. The enthusiasm of representatives at the Powell River meeting augurs well for the future, and it is believed that this year will find a large number of mills on the coast joining with the National Safety Council.

Mr. R. H. Scanlon, in opening the meeting, spoke briefly on the aims of the conference and the opportunity for an organized campaign of accident reduction among Pacific Coast pulp and paper plants.

"Our meeting last year—very successful for an inaugural gathering—was the first definite attempt on the part of pulp and paper mills to come together on the subject of accident prevention and reduction," said Mr. Scanlon. "We are highly gratified at the increasing interest evinced in this year's meeting. We, in the West, have only started seriously on the road to industrial safety, but the main point is that we have started, and will continue to keep going. One of the solutions of a low accident ratio is to get together and discuss our mutual problem. This is the principal object of this gathering, and I sincerely hope you will all benefit by the discussions and return to your respective mills as apostles in the cause of industrial safety."

The Subject of Fire Hazards

"Is your industry Fire Conscious," was the subject of the opening address by Mr. George L. Schetky, representing the British Columbia Fire Underwriters Association. Briefly reviewing the early struggle of man for self preservation, he pointed out that although man had overcome many of the great natural hazards, which in early ages had retarded the march of civilization, we were today faced with new hazards as a very result of this man-made civilization.

"We have exchanged," he said, "the few natural hazards of our early ancestors, for a bewildering number of artificial hazards that have grown up with civilization. Man-made towns are being swept by man-made fires; man-made buildings collapse and bury scores of humans. Man-made ships sink at sea and man-made trains clash in collision. Man's faithful servants, fire, steam, electricity and the process of chemistry frequently escape their bounds and work havoc on humanity."

"Losses by fire," Mr. Schetky said, "have increased in Canada and the United States by more than 1,000 per cent in the last 60 years, while population had increased but 200 per cent. The increase in fire losses could be traced largely to comparatively new devices and processes.

"Our swiftly developing civilization thinks more of using than of safeguarding, and accidents and fire losses are inevitable only so long as this state of mind holds control. Two fundamentals stand out in this connection:

"That, although the aggregate loss by fire constitutes a national problem, all fires are local in origin and are, therefore, locally preventable and controllable;

"That property owners generally have not been sufficiently influenced by their own interests or the welfare of the country at large to use effective means to correct fire waste conditions.

"Fires in factory and business establishments are the cause of 80 per cent of Canada's fire waste," the speaker said. He was pleased to pay a tribute to the energy of the pulp and paper mills in reducing fire hazards in their establishments, stating that The Powell River Company is today one of the leading industrial towns in British Columbia, and they have the lowest fire insurance rate of any manufacturing establishment in the province.

Illustrated Lecture on Logging Hazards

The address of Major H. Steere-Clark, of the B. C. Loggers Association, was one of the high lights of the afternoon session. Last October, at the annual meeting of the National Safety Council at Pittsburgh, Major Clarke's illustrated lecture, emphasizing the natural hazards facing the logger in his work, was chosen for transmission over the National Broadcast. His Powell River address flowed along the same channels and the number of well selected and instructive lantern slides, accompanying his remarks, were keenly studied by the audience.

"Safety First, as a slogan," Major Clark informed the audience, "has outlived its usefulness. It is time worn and no longer meets the demand of modern industry. Safety should be an integral part of our educational system. It should be taught from infancy and be made to dovetail with the every day education of our children. If every youngster when he attains the status of a wage earner, were imbued with the principles and ideals of safety, the special training now necessary for workers could be avoided. Every year thousands of men arrive at the wage earning stage, and the safety lesson must be taught all over again.

"It is not only necessary to have safeguard equipment; the finest plant in the world may lag behind less elaborately equipped mills, if the education of their workmen in safety has not kept pace. Hand in hand with the installation of safeguarded machinery and new and better mechanical protection for workers, must go the continuous education of the employee in safe thinking and safe acting. When these two, the mental and mechanical sides of the safety shield, can be made to harmonize, then, indeed, we have reached the ideal in accident prevention."

Safety, a Business of Reciprocity

George Aitken, safety engineer, State Industrial Accident Commission, Workman's Compensation Law, of Oregon, addressed the delegates on the subject of "General Phases of Safety Work in the State of Oregon." One of the greatest difficulties, the speaker found, in disseminating safety propaganda, lay in the attitude of the employee towards certain types of pamphlets distributed by well meaning, but thoughtless employers, and which the speaker branded as "useless platitudes." It was a case, Mr. Aitken said, of the old story, "Don't do as I do, do as I tell you." This attitude is resented by the average worker; he expects his employer to set the example, and if the employer fails, then the value of the propaganda is almost nil.

"Safety is a business of reciprocity," said Mr. Aitken. "We look upon our own life as a valuable possession, but the life of the other fellow often means little or nothing to us. We can't preach safety to others unless we practice it ourselves. I know men in the United States who scrutinize with the minutest exactitude the quantity and composition of the oil they use in running their cars. But these same men seldom ask their bootlegger, where his liquor was manufactured and what it contains. And yet they are putting it into a far more important place than in their cars.

"The foundation stone in the Safety cathedral is only now being laid," the speaker concluded. "Employees have awakened to the necessity of safeguarding, insofar as humanly possible, the machinery in their plants. But the safety habit is only beginning to be a part of our lives. Cultivate the safety habit, and it will soon transform itself into a gift, a gift of a healthier and stronger humanity. In the State of Oregon, the Workmen's Compensation Board has made great progress in the cause of industrial and civic safety and today the people of Oregon are realizing that Safety First, Last and Always is a mighty good proposition, financially and socially."

Ways and Means of Traffic Safety

"Percy Abell, manager of the B. C. Safety League, discussed the subject "Ways and Means of Traffic Safety." The traffic problem in the city of Vancouver has grown with alarming strides in the past few years, and Mr. Abell, as Manager of the Safety League, has been in the thick of the struggle to eliminate the large number of traffic accidents and fatalities in that city.

"In the city of Vancouver last year, five persons were killed in traffic accidents," said Mr. Abell. "Last year in the United States and Canada, 32,121 people lost their lives as a result of traffic mishaps. In other words, every 17 minutes of the day, one person loses his life in a traffic accident. This is a serious problem to contemplate, and with the increasing complicity of life in our metropolitan cities, its elimina-

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It is one of 28 supplied to a large steel company for use in a 96" plate mill—one of the largest machines of its type ever built. The bearing measures 4 feet 1½ inches outside diameter, 2 feet 5 inches in width and has a bore of 2 feet 5½ inches. It weighs 3½ tons and will carry a load of 8 million pounds at 30 RPM.

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The Timken Roller Bearing Company, Canton, Ohio.

tion is becoming more difficult. In the past three years, these accidents have increased 350 per cent. One encouraging feature in this blue landscape, is the fact that while traffic accidents have increased to this extent, the ratio for children is only 250 per cent. This, in my opinion, is due largely to the efforts of the teachers and members of the school teaching profession, who, in British Columbia, are among our best safety workers. It is a strong argument for the general inculcation of safety principles and safety ideals as a part of the regular school curriculum.

"Eighty per cent of the accidents involving the loss of life and limb are due not to mechanical, but to mental deficiencies. Speed, not faulty equipment, is one of the greatest menaces of our modern civilization. The engineering side of our roads is as nearly perfect as it is possible to make them. And mechanical equipment is on the same plan. The two deficiencies lie in the mental attitude of the individual and the lack of rigid law enforcement.

"The ideal of traffic safety," Mr. Abell concluded, "is a happy combination of engineering, education and enforcement, sprinkled with a liberal dose of courtesy."

Safety, a Principal Aim of Manufacturers' Association

Mr. W. D. Jenkins, representing the B. C. Lumber & Shingle Manufacturers Association, was the final speaker at the afternoon session.

One of the principal aims of the B. C. Lumber & Shingle Manufacturers Association was to reduce accidents among member mills. "And the most effective way we have discovered," Mr. Jenkins stated, "is the quiet and personal dissemination of the Safety Thought among the men. Our committee visits the mills regularly, talks to the men and endeavors to get their opinion on the utility of new devices, or to solicit personal suggestions for improvement in the safety equipment. In the early days, the attitude of suspicion, now happily almost eliminated, retarded progress but today the most valuable suggestions we have obtained come from the men on the job. Last year, we had only three fatal accidents among mills belonging to our association, which represents 50 per cent of the plants in the province of British Columbia. Another very gratifying feature to us is that not a single major amputation case was on record among member mills; no arms, no legs, or hands were lost during the year's operation—an unusual and at the same time one of the most encouraging records we have ever placed on our files.

"The vital problem in safety lies in inculcating the habit of safe workmanship among the men. Co-operation with the man on the job, has been our aim throughout and it is a most powerful aide de camp in reducing accidents among the saw and shingle mills of British Columbia."

During his address, Mr. Jenkins illustrated several methods his association had evolved in the detection and elimination of hazards in the mills. They included sticking red arrows above dangerous pieces of machinery—and insisting that these be left there until the defect was remedied. In this way, a constant reminder was ever present that a hazard existed. This, he found, had proved a most effective weapon in instructing both employee and employer—and reducing the hazards of dangerous machinery.

THE EVENING BANQUET

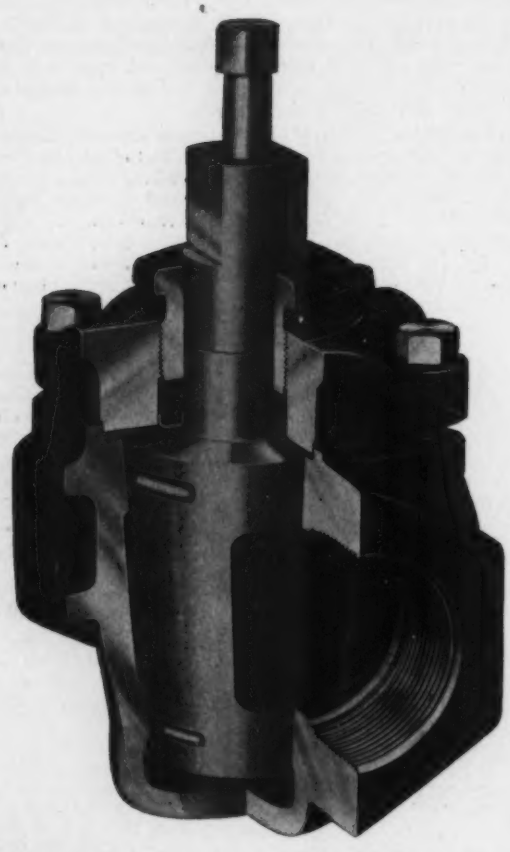
Following the afternoon session, the visitors were conducted on a tour about the townsite, after which they met in Dwight Hall for the evening banquet tendered by the Powell River Company. Over a hundred delegates and invited guests, the latter including all members of local safety committees, and plant superintendents, were present. A musical and vocal program had been arranged and was continued at intervals throughout the evening.

Mr. Bell-Irving Proposes Toast to National Safety Council

The principal speakers at the banquet were Mr. R. Bell-Irving, Powell River Company Resident Manager, and Mr. W.

Delegates photographed at the temporary log crib dam at Lois River, which has been built to store the first 22,000 hp. development undertaken by the Powell River Company in this area

Why Nordstrom builds the PLUG COCK type of valve



Nordstrom Valve with patented "Sealdport" method of pressure lubrication. "Merco" lubricants should always be used.

A plug cock by its nature provides the most effective form of valve for combating corrosion or erosion when the valve is used as a stop in a line. This is because when the valve is opened and the line content is flowing through the valve, none of the vital parts are exposed to disintegrating forces. No machined surfaces are being eroded or corroded. Even in the closed position, the portion of the plug surface which is in contact with the line content, is not the portion required to effect a shut-off with the interior ground surface of the body. The plug cock is also the simplest, most rugged type of valve.

Nordstrom has added to these advantages of the plug cock by embodying a method of pressure lubrication. By its use, plug cocks as large as 30" in size are perfectly practical and easily operated. Also, special "Merco" Lubricants introduced under pressure, offer the most effective method of sealing the valve against leakage long after an unlubricated valve might develop leaks.

This combination of the patented Nordstrom method of pressure lubrication and the natural advantages of the plug cock type of valve, offer the most satisfactory solution to valve problems.

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THE PERFECT APPLICATION OF A PRINCIPLE

H. Winn and Mr. H. B. Gilmore of the Workmens Compensation Board of British Columbia.

In proposing the toast to the National Safety Council, Mr. Bell-Irving made a strong appeal for a close affiliation of western mills with that body. Reviewing briefly the Council's successful history, since its inception in 1912, with 14 member mills, Mr. Bell-Irving went on to say that the National Safety Council today embodied over 5,000 industrial plants on the continent, embracing the lives of over 12,000,000 workmen. The chief object of the association, he said, was the conservation of human life. Its great utility to industry lay in the free exchange of experiences and difficulties between mills. The Council maintained a numerous staff, whose advice and assistance was open to all.

"Mechanical protection is not the answer to a perfect safety record," continued the speaker. "In our own plant at Powell River, we have endeavored to provide every possible mechanical protection for our employees. We believe that, in this respect, Powell River has an excellent record. Yet we cannot claim to lead in Accident Prevention on this continent, although we have one of the finest mechanically guarded plants.

"In addressing this gathering last year, I frankly stressed the generally lower accident ratio prevalent in eastern mills. And this, I felt, was due in no small measure to the greater activity of the National Safety Council in that region. We are improving our safety record in the West, but we have not yet caught up with the East in this respect. And this only emphasizes what the speakers at the afternoon session have told you—that safety education must be universal.

"It may surprise some of the delegates to learn that the average cost to a company of an accident to its worker is $80 each year. For every accident in your yearly list, you spend $80. And I need not remind the delegates here that the loss to the worker is far greater and far more serious. Today, 25 per cent of the largest and most efficiently conducted corporations on this continent are members of the National Safety Council. They consider it well worth their while, and if such organizations feel the benefit of this connection, surely western plants would do well to follow their example.

"Ninety per cent of the industrial accidents today are due largely to a lack of the safety habit. The only real solution to the accident problem is universal education. Mills who have not joined the National Safety Council are holding up the procession and retarding the diffusion of safety education in western plants. Last year we had 14 mills represented here; tonight there are approximately 25 delegates present. This is encouraging and shows that those connected with the pulp and paper industry, who are pioneering the safety field in the West, are displaying an increasing interest in the cause of accident prevention in their industry."

Mr. Winn Stresses Importance of Plant Foremen

Mr. Winn, of the B. C. Workmens Compensation Board delivered one of the most earnest and eloquent addresses of the evening. From his own lengthy experience as an official of that board, Mr. Winn supported Mr. Bell-Irving's statement, informing that not more than 13 per cent of industrial accidents were due to lack of mechanical equipment. In British Columbia, lack of adequate mechanical equipment accounted for about 70 per cent of the yearly industrial accidents.

Mr. Winn strongly emphasized the importance of the plant foremen, on whose shoulders fell the responsibility of carrying the safety habit to the men. The executive of a large corporation, however willing, could not possibly keep in touch with the individual man. This was the foreman's duty.

"If," Mr. Winn continued, "you, as foremen, are not helping the men under your control, you are failing as a foreman and as a man. Safety education is not a thing to be picked up in a moment of enthusiasm, pressed vigorously for a short while and then allowed to languish. Its success depends on continuous, sustained effort and it is the foremen's responsibility to see that the safety habit is an integral part of his relations with his men."

Safeguarding Should Not be Overlooked

Mr. Gilmour, following Mr. Winn, spoke vigorously and pointedly on industrial accident prevention.

"While," he said, "I agree that safety education is the ultimate solution of the safety problem, do not overlook the mechanical safeguarding of the plant. No employer can urge the safety habit, if he himself has not done everything in his power to provide protection to his employees. When you have safeguarded your mill with every possible safety device, then and then only can you say to your workers, 'We have done our share, now do yours.' In the past eight years, as a direct result of improvements in mechanical equipment, the pulp and paper plants of British Columbia have reduced the amount paid to the Compensation Board by 100 per cent."

Toast to Visitors and Responses Show Fine Spirit

The toast to the visitors was proposed by Mr. J. Falconer, Powell River Company Assistant Resident Manager, who was in his usually happy vein. Mr. Falconer, as a son of "Auld Scotia," reminded his hearers that one reason for the supremacy of the Scottish race over all others in the world was their habit of caution. "Safety First" was a creed which the Scotsman learned early and which he always kept with him.

Major Steere-Clark, replying to the visitors toast again reminded his audience that safety cannot be driven. "You cannot drive a man into safe thinking," he remarked. "You can lead him and show the benefit to himself and to his community as a result of the safety habit. What can be done by energetic education has been shown," he pointed out, "by results achieved in the Dutch East Indies, where a campaign for safety in industry was only started three years ago, and today has made healthy and substantial progress.

"Arouse a healthy spirit of competition among your men," concluded Major Steere-Clark, "and a great stimulus will be accorded the habit of safe workmanship."

Mr. W. L. Ketchen, manager of the B. C. Pulp and Paper Company, plant at Port Alice, B. C., stressed the value of a low accident record to the management. Financially and in the happiness and harmony of their workers, elimination of accidents was a big asset to a plant. He concluded by bringing forward a suggestion that a new safety shield be placed for annual competition among the industrial plants of British Columbia and the neighborhood states. The loser of the competition, suggested Mr. Ketchen, should defray the cost of the shield.

The banquet was an unqualified success from every standpoint. The seating arrangement had been prepared in advance by John McIntyre, Powell River Company architect and every visitor found himself between two Powell River employees. Chairman R. H. Scanlon introduced each of the delegates to the audience and as the evening wore on, the fraternal spirit was very much in evidence. Each member of the audience was also presented with a special souvenir menu, the work of Mr. McIntyre and with souvenir badges on which the individual names were printed.

R. H. Scanlon Voices High Appreciation

Mr. R. H. Scanlon, in his concluding remarks, thanked all the delegates for their attendance at the meeting and for the fine spirit, co-operation in which they had met his invitation to gather at Powell River.

"The Pacific Coast Pulp and Paper mills have shown by their attendance this year," declared Mr. Scanlon, "that they are behind the movement to promote an organized Safety Campaign in their plants. During the past year several new members have affiliated with the National Safety Council, and we hope the enthusiasm displayed at this meeting will be the means of bringing every pulp and paper mill on the Pacific Coast into the fold. We all want to reduce our accidents, and from the remarks of the speakers here tonight, the best way to do that is by an organized campaign of education. The National Safety Council, with their large and experienced staff, is the best medium I know through which to work in the cause of safety.

"We, as members of the pulp and paper industry, take a just pride in the fact that our industry is leading the safety movement on the Pacific Coast. We are the pioneers of safety in the West. Until the Powell River meeting last year, there had not, in the industrial history of the Pacific Coast, been a single conference called for the sole purpose of discussing the vital problem of safety in industry. We have started the ball rolling. Let us keep it rolling."

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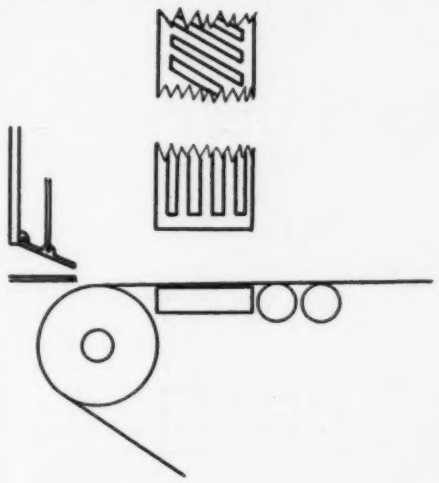
Practical Helps for the Mill Man

Improving Formation

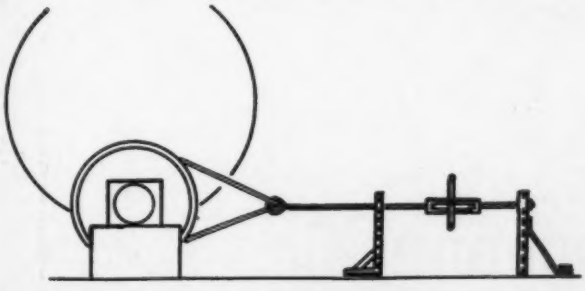
HOW to make the formation better is an ever-present problem on fast news or fast catalogue paper machines. The device shown in the sketch is considered by many superintendents to be one of the answers to this problem. It is



called a forming board. The board is made wide enough completely to replace two table rolls. There are two arrangements commonly in use. These are shown in the sketch. In one several slots go across the wide of the machine. Another uses diagonal slots. It is claimed that this device will eliminate "worms" in the paper.

Temporary Friction

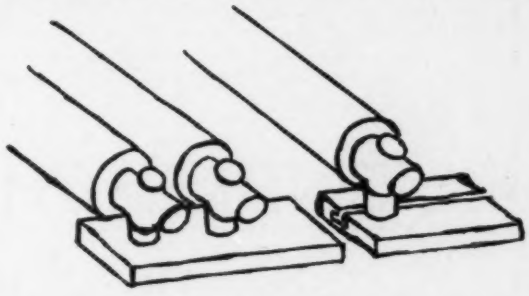
A TEMPORARY device to use when the take-up screws on the reel friction give out is shown in the sketch. It consists of a larger strap around the friction drums connect-



ing to a rod and turnbuckle. In one mill it was put in to bring the control of the friction closer to the wheel where the third hand had to start the winder.

Adjustable Table Rolls

IN some modern machines, the table rolls are fixed as shown in the first two rolls at the left in the sketch. One superintendent pointed out that it was far better to have an arrangement as on the roll shown at the right. That is, to have the machine frame slotted so that the table rolls might be adjusted according to condition. No possible calculation made before the machine was started up could determine exactly what spacing would best suit the conditions of



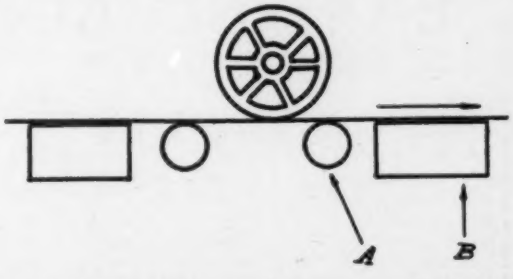
the mill. Moreover, it has long been the practice to take out some table rolls in summer when the stock is freer, but with the large sized rolls now used, the gaps from roll to roll are such that adjustment of the remaining rolls is desirable.

Longer Life on Filter Cloth

IT has been determined by one superintendent that the life of the wire cloth on disc filters can be improved enormously by the use of corduroy cloth. This can be used on most types of the filter without any backing and withstands the wear much better than plain mesh. By cutting wedges out of the part of the cloth where it goes over the edge of the disc it will fit satisfactorily under the calking material.

Reducing Wire Wear

ON new, wide, fast machines making papers requiring a dandy, it is well to consider the effect of running the very heavy dandy needed to span the width of the machines just ahead of a suction box without an intervening roll. On



one machine where modern conditions had made the wire life seem inordinately short, the condition was improved as shown in the sketch. Before the roll (A) was placed in the machine between the dandy and suction box (B), the seam could be heard going click as it struck that suction box. With the roll in place there was immediately an appreciable improvement in wire life.

The Jeffery Manufacturing Company, Columbus, Ohio, recently opened a direct factory branch office located at 602 Esperson building, Houston, Texas. Thomas P. Burke has been appointed district manager in charge of the sale of all Jeffery products including conveying, elevating, crushing and transmission machinery, chains, and portable loaders and conveyors.

KRAFT PULP

K. H. B. — UDDEHOLM — WIFSTA WARF
DYNAS — FORSS

UNBLEACHED SULPHITE

SKONVIK — WIFSTA WARF — FORSS

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The Month at Washington

CONGRESS Adjourns—With the adjournment of Congress March 4, we find the usual state of chaos and the usual last minute scramble to get important bills passed with somewhat the following result:

The bill passed by the House (H.R.2828) amending the trade-mark act, received a favorable report by the Senate Committee on Patents, was put on the calendar but hung fire as the session ended. A similar bill twice passed the House before at the 69th and 70th Congress. The bill follows in general the trade-mark act of 1905, which notwithstanding certain defects, has operated on the whole quite satisfactorily for a quarter of a century, which may be one reason why the Senate has been slow to act on it. It is the aim of the bill to retain all that is good in the present laws, while improving their language and the procedure thereunder. The bill also consolidates in one act what now is scattered through six separate statutes. The bill retains in force all existing trade-mark registrations so that there will be no necessity for the reregistration of any trade-mark already registered. As in the act of 1905, the bill does not permit registration of marks if used only in intrastate commerce, but permits registration of marks used in interstate commerce. The bill also takes care of our treaty obligations and more especially the inter-American trade-mark treaty signed in Washington back in 1929 and ratified by the Senate on Dec. 16, 1930. The entry of marks is permitted for a very small fee so that the Patent Office may have as large a collection as possible of marks which are in use thus permitting manufacturers to search the files and make sure that they will not adopt a mark which is already in use. The bill also provides for the registration of union labels, collective marks and marks of associations, as well as trade names and devices used in relation to specific goods or service, something the present law does not permit.

A bill was introduced in both the House and Senate (H.R. 17238 and S.6051) to further the commerce of the United States by creating the World Commerce Corporation, a worthy piece of legislation for which however there seems to be no concrete support. This corporation would serve the industries of the country by organizing, operating and maintaining a clearing house for commerce, through which a world-wide distribution of products could be made; organizing, operating and maintaining foreign trade zones under the jurisdiction of the United States; erecting, operating, and maintaining shipping terminals with all necessary equipment, including storage houses and fuel stations, and serving all means of transportation; controlling reserves of natural resources that will supply ships with return cargoes and stabilize prices of raw materials which the industries of the United States must obtain abroad; organizing selling and purchasing agencies throughout the world with clearing facilities for manufacturers, merchants, exporters, importers and citizens of the United States for all kinds of commercial transactions, and furnishing loans and credits through banks or directly to corporations, firms and individuals and to manufacturers, merchants, exporters and importers.

The copyright registration of designs bill (H.R.11852), passed by the House also failed of passage in the Senate, although favorably reported and placed on the calendar for action by the Senate Committee on Patents. Under the copyright act of 1909 works of art and models or designs for works of art were enumerated and under this section there have been copyrighted all kinds of original designs, though no provision was made for the protection of reproductions of designs when applied to manufactured products. As a result, there has been much pirating of designs which has seriously disrupted various industries.

Several desperate attempts were made to prohibit the importation of products of convict and forced labor to protect labor and industry of the United States (H.R.16517), committee hearings were held, and the bill favorably reported and placed on the calendar, but that ended it. The basic principle of this piece of legislation is that the free labor of America shall not be subjected to the burden of competition with nonfree labor abroad. The most serious difficulty experienced in enforcing existing statutes is the inability to secure evidence concerning the use of convict, forced or indentured labor abroad. The enactment of this law would cure many existing defects in the present law by adding the words "produced, transported, handled and loaded or unloaded." The bill is aimed particularly at Russia, and was passed by the House but tabled by the Senate Finance Committee and indefinitely postponed by a vote of 8 to 6.

Nothing came of the joint resolution (S.J.Res.58), creating a commission to study proposals for a national system of express motorways and establishing and maintaining such a system.

The House bill (H.R.9934) to sell certain timberland in four townships in Minnesota came to naught in the Senate Committee on Public Lands and Surveys. This bill would sell this land in lots of 160 acres at $2.50 an acre under the regulations to be prescribed by the Interior Department.

The House bill (H.R.17241) to aid labor in its old age, did not get very far, being introduced too late in the session. The same thing is true of H.R.17279 seeking to provide a fund for federal public works in time of business depression to stabilize business and to provide work for the unemployed.

The House passed the Wagner National Unemployment System Bill (S.3060), creating in the Department of Labor the U. S. Employment Service.

The Senate Committee on Commerce reported favorably the Wagner resolution to create a committee for the study of unemployment insurance systems. (S.Res.435).

Several bills relating to the postal service also hung fire, including a bill (H.R.11096), making a charge of 5c in addition to the regular postage for each piece of insufficiently or improperly addressed mail; (S.3178); but a bill (H.R.8649) was enacted and signed by the President (Public No. 585), authorizing the postmaster general to collect an increased charge for return receipts for domestic registered and insured mail when such receipts are requested after the mailing of the articles.

The Business Situation—Trade with Latin America shows an upward trend, with February the first month since 1929 to experience increase in values of shipments, exports in 1930 having decreased in value 29.46 per cent below the value of those in 1929. The Federal Reserve Board shows that industrial activity increased in both January and February, with production, employment, distribution, wholesale prices, bank credits, and money rates all showing favorable reactions.

Dr. Julius Klein issued a favorable statement indicating that we are emerging from the depression and are on the upward climb at last. The more the business peaks are flattened out the better will be the control of the slumps, he points out, and that the business recession was in many instances the final episode in a long sequence of causes rather than the fundamental reason for current difficulty. With indications of improvement apparent, business has learned several salutary lessons from the trials of the last few months.

The United Kingdom has taken the lead as a market for American goods, although foreign trade has shown generally a marked decline with all countries except Russia, with whom foreign trade gained last year.

The Labor Situation—The President's Advisory Committee on Employment Statistics submitted a report chucked full of valuable information, containing recommendations for the im-

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provement of the methods of measuring employment and unemployment as well as a thorough study of the technological unemployment problem. For more satisfactory and reliable measurement of unemployment in the future, the Committee urges prompt extension of employment statistics and the continuance of the decennial census of unemployment.

A shorter working week, an increasing sense of social responsibility on the part of industry and the attainment of a greater measure of security from the hazards of industry during the next decade were predicted by Dr. Joseph H. Willits, a member of the President's Emergency Committee for Employment. These predictions were based on the most significant developments in the field of industrial relations during the last decade.

An improvement in the industrial employment situation was revealed by reports received in the last few months by the U. S. Employment Service, with improvements noted in industrial field as a whole. While the improvement was slight, it was an improvement nevertheless and it is believed that the low level of operations has passed and that further improvement can be expected in the next few weeks.

The annual rate of labor turnover was reduced by half in 75 industries in 1930 over 1929, while approximately two-thirds of the people becoming separated from their employment during the year obtained work again, says the Department of Labor. Because of the scarcity of employment a far smaller number of people voluntarily quit their positions, although curtailed production and operation resulted in employers laying off about twice as many men as in the previous year. Workers in industry became more apprehensive of losing their positions and sought to do their work more efficiently and carefully.

Forest Notes of Interest—A new film has just been released by the Office of Motion Pictures, Department of Agriculture, showing how forests serve man—a two reeler, sponsored by the Forest Service, showing some of the ways in which protected forests serve by providing work in the woods, in mills, at factories and in building. Copies of these films may be borrowed without charge other than the cost of transportation.

The purchase of 254,022 acres for national forests was approved by the National Forest Reservation Commission in a recent meeting in Washington, the purchase authorization covering 290 tracts in 26 units lying in 19 states east of the Great Plains at a cost of $1,186,159.40, most of the purchases lying within national forests already established. Lands acquired will be administered by the Forest Service for timber growing, safeguarding watersheds, etc.

Tree planting in the eastern and southern national forests has increased nearly sixfold in the last three years, says the Forest Service, who now operates several nurseries, yet three years ago had only one small nursery in Region 7 where now 6,000,000 seedlings are growing. Experimental stock is being grown in many sections.

Wholesale Prices—The index to wholesale prices computed by the Bureau of Labor Statistics shows a recession on 550 commodities, with paper and pulp unchanged in price for January. With 1926 as the basis of 100 we note the following changes:

	Jan. 1930	Dec. 1930	Jan. 1931	Purchasing Power of the Dollar, January 1931
Paper and Pulp	87.3	83.6	83.6	1.196

The Employment Situation—Changes in employment and pay-roll totals in January, 1931, as compared with December, 1930, based on returns of over 40,000 establishments in 15 major industrial groups, employing 4,510,051, shows a decrease—largely seasonal—of 4.2 per cent in employment and a decrease of 8.2 per cent in pay-roll totals. With 1926 as the basis of 100, we find the following changes:

	Employment			Pay-roll Totals		
	1930		1931	1930		1931
	Jan.	Dec.	Jan.	Jan.	Dec.	Jan.
Paper and printing	102.1	95.7	93.6	106.3	97.9	93.9
Paper and pulp	96.0	84.9	82.5	96.4	79.3	74.9
Paper boxes	92.8	87.7	82.8	96.4	87.4	79.8
Printing, book and job	104.9	98.0	96.8	108.5	99.8	97.3
Printing, newspapers	109.8	108.4	107.1	114.0	112.4	108.1

Supervision of Radio Advertising—Restriction of advertising over broadcasting stations is advisable in the opinion of the U. S. Court of Appeals of the District of Columbia in a recent decision handed down, according to a statement issued by the U. S. Radio Commission, especially where a broadcasting station may be used primarily to promote a particular business, the court opinion holding that broadcasting should not be a mere adjunct of a particular business but should be of a public character.

Russian Notes of Interest—The circulation of Russian newspapers could be increased 30 or 40 per cent if an adequate supply of paper could be produced, says the Department of Commerce, disclosing an acute paper shortage in the Soviet states, because of the inability of the Soviet paper mills to meet the growing demand.

The Treasury Department excluded certain imports of Russian pulpwood in a recent order because of the use of convict labor in the pulpwood and lumber industry in four sections of Soviet Union in northern European Russia (Kola Peninsula (including Murman Coast); Karelian Autonomous S.S.R.; Northern Area; Zyryan [Komi] Autonomous Area). In connection with the order issued all of the Russian territory above latitude 60 degrees is included within its scope according to the Customs Bureau, embracing the Archangel area, the heart of the pulpwood territory. The pulpwood is floated down the Devina river to Archangel on the White sea, where it is prepared for the market. The Treasury concludes that convict labor was employed in these activities. Under this ruling the burden of proof will be on the importer to show that the goods were not produced by convict labor.

Bursting Test of Paper—The bursting test of paper depends upon the strength of the paper but will not reveal its weak characteristics, according to studies recently made by the Bureau of Standards, which finds some of the variables commonly alleged to affect the bursting test or pop test of paper are but phantoms. In the Bureau tests the strength of paper is determined by forcing the paper through an aperture by means of hydraulic pressure until it bursts. Variables were studied such as clamping pressure, nature of the clamping surfaces, size of the bursting orifice, types of diaphragms, speed of operation of the tester, viscosity of the liquor medium in the hydraulic chamber and pressure gauges. The type of diaphragms ordinarily used, the amount of bulge of the diaphragms, and the viscosity of the hydraulic medium were found to be without appreciable effect upon the test. On the other hand, the clamping pressure if insufficient seriously affects the accuracy of the tests.

Crackleproof Paper Developed for Radio—Crackleproof writing paper, ideally adapted for use before the radio microphone, which so easily picks up the slightest noises and reproduces them with surprising volume for the listener, was recently developed says the Textile Division of the Department of Commerce. It came out of the new uses of cotton investigation and the product contains most of the qualities of good bond paper with the added factor of "crackleproofness."

The paper is a cotton-processed fabric, soft and pliable, with sufficient stiffness to be folded, and its use over the radio eliminates crackling and rustling noises of ordinary bond or other paper. Ordinary bond paper is made from wood pulp or from good grades of cotton and linen rags, but the new paper is made from cotton sheeting of loose, plain weave, taking typewriting or ink without blurring and producing clear carbons, as well as all forms of printing, embossing and engraving.

Supreme Court Decision—In Story Parchment Co. vs. Paterson Parchment Paper Co., (No. 57), the Supreme Court of the United States in a recent decision held that the uncertainty in fixing damages caused by conspiracy, was no bar to relief, affirming the award of the trial jury based on losses of business and property due to alleged price cutting in interstate trade in parchment paper. The case arose under the Sherman Anti-Trust Act to recover damages resulting from an alleged conspiracy between respondents and the West Carrollton Parchment Company to monopolize interstate trade and commerce in vegetable parchment, exclude the petitioner therefrom and destroy its business in such trade and commerce. The jury returned a verdict for petitioner for $65,000. The trial court approved the verdict and rendered judgment for treble the amount of damages in accordance with Section 7 of the Act.

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The Largest Sulphate Pulp and Paper Mill in the World

Makers of

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Capacity

500 TONS DAILY

PACIFIC COAST

WASHINGTON

The Kaplan Paper Co., Seattle, is carrying on an extensive direct-by-mail advertising campaign to sell the bankrupt stock of the Cascade Paper Mills, which closed last year. This jobbing house purchased the whole line of fine book stock, bonds, railroad manilas and non-fading poster, besides the catalogue papers, soap wrappings, and similar lines. The stock is being marketed in quantities to suit the buyer, either in ton lots, cases, reams or bundles, one kind or mixed. The Cascade Paper Mills, formerly operated at Tacoma, were closed a number of months ago with a large line of fine merchandise on hand.

The Keystone Paper Box Co. of Seattle, is increasing its capital stock from $40,000 to $75,000.

The Riverside Paper Co., Tacoma, has been incorporated for $125,000 by Anne P. McLean and Alfred E. Sannes. This company, according to recent report, has purchased the machinery and equipment in the mill of the Union Paper Mill Co., Monongahela, Pa., now defunct, and plans to ship this to Tacoma where it will be utilized in a plant the nature of which has not yet been announced.

Franz Sturm, a chemist at the mill of the Crown-Willamette Paper Company, Camas, is one of the latest members of Tappi. He is a graduate of Stanford and was formerly with the Colgate-Palmolive-Peet Co.

The St. Regis Pulp & Paper company, Seattle, will manufacture heavy bags for cement and other materials in the new plant which will include a factory and warehouse to be built for its use and leased to the paper company by the Elliott Bay Mill company. It will be approximately 140 by 148 feet in size of one-story, costing $30,000. The Austin company has the construction contract.

Burt P. Kirkland and Alex J. F. Brandstrom, associated with the University of Washington in the College of Forestry, have received appointment to the research department in the Forest Service as economic specialists.

Construction is progressing rapidly on the new 250-ton sulphite plant at Longview, for the Weyerhauser Timber company. Acid tanks are being erected at this time and all foundation piling have been driven.

CALIFORNIA

Hubert L. Carter of Boston, president of Carter, Rice & company, made a coast trip last month, during which visit several changes were announced for the Pacific coast territory. Charles Beckwith, Pacific coast manager of the company, who has been located in Seattle for four years, has moved to San Francisco, where from the company's headquarters at 240 Howard street he will continue to direct all the coast activities of the company, which includes headquarters at Portland and Seattle. Allen M. Olinger who has been manager of the San Francisco office will continue in that capacity, as will also James W. Murphy manager of the Portland office and E. E. Embree of the Seattle office.

Organize Paper Credit Bureau

The Printing Paper Credit Bureau of Southern California has been formed by George I. Tompkins, of the Sierra Paper Co., prime mover in the organization; Blake, Moffitt & Towne, General Paper Co. and the Zellerbach Paper Company, all of Los Angeles. Mr. Tompkins is chairman of the committee in the Pacific States Paper Trade association which has for its motive the handling of problems of terms and credits.

S. J. Coffman, a man experienced in association work of various kinds, will be director of the new bureau, which will maintain a confidential credit exchange for its members. The new bureau is the first one of its kind organized on the west coast to serve the paper trade exclusively, according to the director.

The Howard Paper company of Urbana, Ohio, has appointed Blake, Moffitt & Towne as sole distributors of their products in the Pacific Coast territory, effective February 1.

The General Paper Co., of San Francisco, is now distributing a new line of watermarked sulphite bond known as "Old Mission Bond," according to W. B. Reynolds, sales manager of the company.

L. A. Colton, of the San Francisco office of the Zellerbach Paper Co., chairman of the program committee for the annual convention of the Pacific States Paper Trade Ass'n, which is scheduled to start May 11 for six days, at Del Monte, is lining up features for the program and will have the full program ready to announce very shortly.

C. D. De Mers, engineer with the Taylor Instrument Corp., Rochester, N. Y., has been covering west coast territory visiting plants in the pulp and paper industry.

Alex Galloway, sales manager of the Oregon Pulp & Paper Co., Salem, has been visiting the southern California trade recently.

The Carpenter Paper Co. of California, Ltd. has been organized with a capital stock of $100,000 to make and distribute paper specialties. Kenneth C. Holland and associates of Los Angeles, are included in the group sponsoring the company. Isaac W. Carpenter of Omaha, Neb. is also named as an interested member. Attorneys representing the company are Leland S. Bower and W. A. Martin, Financial Center building, Los Angeles.

Harold L. Zellerbach of San Francisco and O. W. Mielke of the Portland office of Blake, Moffitt & Towne, attended the convention of the National Paper Trade Association as representatives of the Pacific States Paper Trade Association.

OREGON

The Sitka Spruce Pulp & Paper company, Empire, loaded 500 tons of pulp on the Quaker Line steamer Marcos, February 17, for shipment to Philadelphia. C. W. Parker of the Sitka Spruce company has been in Washington, D. C. briefly on his eastern trip which was made recently in the interest of general business for this company. This plant since its completion about a year ago has been doing considerable shipping to Atlantic coast points.

Graton & Knight, Worcester, Mass., will establish a branch distributing headquarters in Portland, where W. F. Kinnally, representative in the territory for many years for kindred lines, will be manager. The new branch, which will be located at 76 First street, will serve Oregon and Idaho, which have heretofore been served from Seattle, where a branch has been maintained for sometime. Other west coast branches are at San Francisco and Los Angeles.

Members of the Pacific Coast Association of Pulp and Paper Manufacturers, met at the Benson hotel in Portland late in January for informal discussion of important problems and to make tentative plans for the annual meeting to be held at Del Monte in May, where for the first time this

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Light Weight and Opaque Papers a Specialty

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association will meet as an organized group to celebrate its first birthday. A program of interest to each individual manufacturer is in the making.

C. W. Morden, chairman of the Pacific Coast Section of Tappi, was an interesting speaker before the Portland chapter of the American Society of Mechanical Engineers at its February meeting held at the Heathman hotel, taking for his subject the pulp and paper industry of the Pacific northwest. C. C. Hockley, paper mill engineer and Ray Smythe, manager of the Willamette Iron & Steel Co. which is making paper mill equipment, also gave talks on this program.

Alan C. Dunham, Portland, Pacific coast representative of the Lockport Felt company, left for San Francisco the last week in February to meet W. H. Lee, president of the company, who with Mrs. Lee and their 13-year old son, will tour the coast in their Lockheed-Vega seven-passenger plane, having left New York February 24 and having arrived at Los Angeles the 26th. Mr. Dunham will travel with the party which is visiting all leading cities.

The addition which has been under construction at the plant of the St. Helens Pulp & Paper company, St. Helens, for the purpose of housing a second paper machine, has been completed and plans are rapidly going forward toward the installation of the 202-inch Beloit machine.

The International Pacific Pulp & Paper Co. has filed articles of incorporation in Portland, with a capital stock of $1,100,000, incorporators being H. C. T. Bayer, F. W. Stevens and W. G. Smith. An unofficial report indicates that this company will open and control the operation of the plant here, formerly operating as the Multnomah Box & Lumber Co. which has been closed for sometime.

Manufacturers of paper boxes and cartons in the northwest are putting on a vigorous campaign to persuade local buyers to use locally made products, as it has been discovered that competition from other sources has cut in to an alarming extent. Radio over the Northwest Broadcasting system is being utilized to get the message across.

The Fir-Tex Insulating Board Co., St. Helens, which has been in operation about eight months, received in February an order for 15,000,000 square feet of Fir-Tex from the Kelvinator Corp., Detroit, Mich., manufacturer of refrigeration equipment. One million feet will be shipped at once and the remainder at regular intervals.

Sunset Paper Products Plan Mill

The Sunset Paper Products Co. Ltd., which has been organized under the laws of Nevada, has been authorized by the California Corporation Commission to launch a stock sale, including 8,994 shares of preferred and 4,497 common shares in units of two preferred and one common at $101 per unit. Authorized capital is 10,000 shares of $50 preferred and 10,000 shares of no par common.

Officers of the company are: president, J. E. Smith whose home address is Miner building, Eugene, Oregon, near which town the company proposes to build a plant; vice-president, Irwin R. Gross, Russ building, San Francisco; secretary-treasurer, Carolyn Short, 326 O'Farrell st., San Francisco.

Report that some company was planning a mill in the vicinity of Eugene, have been current for sometime, but with the floating of this stock issue came the announcement that the site would be at Springfield, three miles from Eugene, where convenient and reasonable power is available, and where the inducement of a free site is understood to have been offered by Oregon business interests.

The company plans to make its own groundwood pulp but will buy its sulphite pulp, operating one paper machine in the manufacture of high grade board and some special grades of index papers and similar office supplies.

❖ WISCONSIN ❖

Nicolet Paper Co. Reorganized

Annual meetings of Wisconsin paper mill corporations continue to reflect satisfactory conditions, and in the case of the Nicolet Paper Co., DePere, Wis., a re-organization which will overcome past difficulties and place the concern in a stronger position for the future.

A new corporation known as the Nicolet Paper Corporation, including as directors several of those identified with the former company, has been organized to take over the assets of the Nicolet Paper Co. It is a Wisconsin corporation capitalized at $400,000, with 2,000 shares of common and 2,000 of preferred stock, par value $100. Glassine and greaseproof papers will be manufactured, as has been the case since the Nicolet company purchased the mill several years ago from the American Writing Paper Co.

C. B. Clark, president of the Riverside Corporation, Appleton, is president of the new company; H. B. Kuhns, Chicago, vice-president; E. J. Dempsey, Oshkosh, secretary, and Arthur T. Brown, treasurer and general manager. Others on the board of directors are: W. C. Wing, president of the Fox River Paper Co., Appleton; F. E. Ballister, Neenah, Wis.; Mowry Smith, Menasha, Wis., and Paul Bushong, of Gladstone, Mich. Mr. Brown, Mr. Kuhns and Mr. Ballister are new men on the board.

Net earnings of the Kimberly-Clark Corporation, Neenah, for 1930 were $3,011,357 after all charges including bond interest and federal taxes, according to a preliminary report. This is a decline of about $800,000 from the year 1929, when the earnings were $3,872,615. Earnings are equal to $4.82 a share on 499,800 shares of common stock, as compared with $6.54 a share the previous year.

Whiting Paper Co. Elects President

In reorganization of the official personnel of the George A. Whiting Paper Co., Menasha, because of the death of George A. Whiting, president, his son, Frank B. Whiting was elected president to succeed him. R. M. Sensenbrenner is vice-president, George Hilton, of Oshkosh, Wis., secretary, and Mr. Whiting, treasurer.

E. A. Oberweiser continues as president of the Whiting-Plover Paper Co., Stevens Point. Frank B. Whiting is vice-president, and George Hilton, secretary.

Reports of a successful year were submitted at the annual meeting of the Hoberg Paper & Fibre Co., Green Bay, and the outlook for 1931 is reported as very favorable. Officers and directors were re-elected.

Additional warehouse space of 3,000 square feet will be given Riverside Paper Corporation, Appleton, Wis., by a single story brick addition 47 by 60 feet. About $6,000 will be spent on the improvement. C. R. Meyer & Sons Co. has the contract.

Fight to Retain Level of Lake Winnebago

Paper mill owners and other water power interests of the Fox River Valley are putting up a stiff fight, in co-operation with municipal officials of cities and villages in that section, to retain in effect a recent order raising the storage level of Lake Winnebago 6¼ inches.

Riparian owners and upper river cities demanded a hearing after the level was raised recently to 21¼ inches above the crest of the control dam at Menasha, Wis. The hearing was held at Menasha with Attorney J. P. Frank, and T. E. Orbison, of the engineering firm of Orbison & Orbison, representing the waterpower interests. Proof was shown that the additional supply of water afforded by this method of storing it up in the vast lake saved mills thousands of dollars

FORTY-SEVEN YEARS AGO

WHEN the village "Paper Man" recommended the first Detroit product to the business man of your Grandfather's day, he said, "It is as good as it can be made." That was about the time that the slow cooking, Mitscherlich process was developed in this country.

The new ideals of quality which were by that process established, we have never sacrificed. To maintain those ideals unchanged throughout forty-seven years of continuous business growth and expansion, has required changes so vast that the average man of that generation would be amazed if he could see the changes and the improvements in Detroit Sulphite's Mill today.

The increase of knowledge and experience, the progress of modern science, invention and research have contributed their utmost to making all of Detroit's Products as good as good Pulp and Paper can be made.

"MAKERS OF PAPERS OF STRENGTH"

Detroit Sulphite Pulp & Paper Co.

DETROIT, MICH.

DETROIT'S PRODUCTS STAY SOLD

CONCRETE
ACID STORAGE TANKS

--built and lined by Stebbins, have many distinctive advantages over any other type.

They are increasing in popularity among sulphite men who are anxious to reduce costs and gain a new element of flexibility in mill operation.

Our experience during the past ten years in constructing and lining these tanks is at your disposal. We will, on request, analyze the many advantages of concrete acid storage tanks and quote prices for your plant.

STEBBINS
Engineering & Manufacturing Company

WATERTOWN, New York

SEATTLE, Washington

on power bills during the dry summer season, and that navigation was hampered by a lack of water. Cities attacked the problem from the sanitation and fish preservation angle. Riparians claim they suffer losses from flooded lands, destruction of muskrat habitats, and that upper cities also face flood and sewage problems.

The war department, through Major H. M. Trippe, will decide the final status of the water control.

Within a very short time the School Stationers Corporation, Menasha, Wis., will occupy its new building. All of the exterior work is finished and only a few days more were required to complete the interior. The building, costing about $30,000, will house a large warehouse, shipping room and offices of the company.

Forestry Items

Additions totalling approximately 21,000 acres will be made to the federal timber preserves in Wisconsin, following purchase authorizations as follows: Flambeau unit, 11,252 acres, $16,075; Moquah unit, 3,168 acres, $5,379; Oneida unit, 6,775 acres, $13,585. Michigan additions include: Hiawatha forest, 1,155 acres, $1,732; Marquette unit, 1,800 acres, $2,700. Wisconsin purchases under consideration also include large acreages in Oconto, Mondeaux and Namekogan units.

In addition to these moves by the government officially to preserve forests for the future, the Wisconsin Conservation Commission also is making a showing. Lands totalling 139,355 acres have been approved for entry under the forest crop law exempting them from property taxes until the timber is cut. This makes a total of 420,000 acres in 27 counties now included in state controlled preserves.

Part of a federal appropriation of $169,000 for forestry work will be spent on a nursery at Rhinelander, Wis., capable of supplying 10,000,000 trees annually. The tract will be 20 acres and about $10,000 will be spent to create the nursery. Roads, fire lanes and warehouses costing $47,550 are being built in the Moquah, Flambeau and Argonne forest districts by an emergency employment crew of 100 men so as to give adequate access and fire protection to these government areas.

Because of lack of snow this winter, logging operations in the northern Wisconsin woods have been cut 50 per cent. The supply of pulpwood therefore being shipped to the mills is not as large as usual.

That which most encourages reforestation is the opportunity for profit by private owners of timberlands. As figured out by John S. Bordner, of the state land department, a first thinning of white pine and white spruce after 30 years will pay the cost of land and planting, plus compound interest, and leave a net profit of $5.96 per acre; a second thinning at 60 years, net profit of $141.91 per acre; a final cutting at 80 years, $739.28 net profit per acre. Allowance is made for death of half of the trees and estimates are based on stumpage value of $4 a cord, and $15 per thousand board feet. Cost of planting is $6 per acre and land, at present values, $2 per acre. Taxes paid on 50,000 acres under the new severance law would be enough to pay the entire $41,000,000 required for state government in Wisconsin.

Safety schools are being held at Appleton, Neenah, Green Bay, Marinette and Nekoosa with a large attendance and expect to conclude their sessions within the next few weeks with banquets and the awarding of recognition in some form for regular attendance. D. D. Fennell, of Chicago, Dr. Wm. J. H. Boetcker, of Erie, Pa., A. H. Hudson, Chicago, F. M. Kreml, Evanston, Ill., Major Norman A. Imrie, Dr. Ernest Corn, of Chicago, and Elwood T. Bailey, of Los Angeles, Calif., have given addresses.

To have completed an entire year without a lost-time accident, and with a perfect record for two weeks on the second year is the achievement of the Interlake Pulp and Paper Co. division of the Consolidated Water Power & Paper Co., at Appleton, Wis. On Feb. 16, 1930 the employees began their march to a new record and the interest became more intense every day as the year began closing. There are 225 employees in the mill. The wood room, with 42 men and plenty of hazards, has rounded out two years of safety. The electric department and the boiler house have over six years to their credit. The Consolidated's mill at Stevens Point is making the next best record, having operated since August, 1930 without a lost-time accident.

Work will be carried through this summer on a new power dam at Kaukauna, Wis. The United States Government has authorized an expenditure of approximately $150,000 for this purpose. An old wooden dam in existence for many years will be razed. The new one will be of concrete, with eight steel sluice gates and two large concrete spillways.

As a means of more effective instruction in pulp and paper classes, the state department of vocational education has had prepared a booklet entitled "The Significance of Pulp and Paper Industry in Growth and Development of Civilization." Its pages are made up of all types of paper made in Wisconsin mills, including covers of Cellusuede, resembling leather and made by the Mosinee Paper Mills. The book deals with the history of paper, classifications and definitions, raw materials, steps in manufacture, and the advantages and disadvantages of occupations in the industry. Views of the mills in the state also are shown on some of the pages.

One hundred thousand perch a year old have been placed in Lakes Rosebush and Miscauno by the Northern Paper Mills, Green Bay, through its subsidiary, the Northern Electric Co. The lakes were created by storage of the company's two dams at Amberg.

Only 25 per cent of the normal power supply from the dams is available for the Flambeau Paper Co., Park Falls, because of the drought of the last nine months. The mill is obliged to purchase most of its power from the Superior District Power Co.

F. E. Sensenbrenner, of the International Wire Works, Menasha, described the history and growth of his company at a meeting of the Rotary club at Menasha, recently, after which he took the members through the plant to show the wire making processes. The company has a thoroughly modern plant since completion of a recent addition, and operates 11 automatic looms.

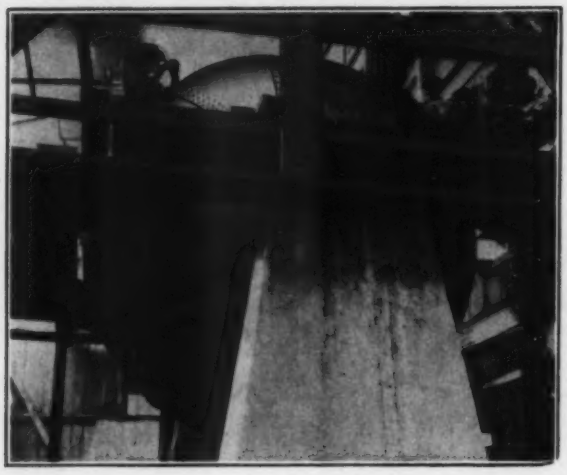
An estate of about $900,000 was left by the late A. W. Priest, of Appleton, capitalist and former paper mill owner. Inheritance taxes of $82,075.85 were paid to the State of Wisconsin.

Institute Completes First Year

Gilbert Paper Co., Menasha, Wis., and Staley Starch Corporation, Decatur, Ill., have given scholarships of $1,500 each to the Institute of Paper Chemistry at Lawrence college, Appleton, Wis. The Gilbert scholarship was awarded to Richard Crane, a graduate of Wooster college, and the Staley scholarship to P. Fredrick Gross, a graduate of the University of Southern Colorado.

The institute has now completed its first year and its achievements exceeded all expectations. Although there was a large list of applicants for the first two semesters, the qualifications were considered carefully and only 15 were admitted. They came from educational institutions from coast to coast and all are graduate students.

After completion of a new building during the coming summer, the institute will have larger quarters and will be prepared to take on a larger enrollment, according to Dr. Otto Kress, director. Courses lead to the degree of master of science in paper chemistry. Every student is a candidate for a master's or doctor's degree and therefore is required to prepare a thesis. Research problems count as classwork, and actual problems assigned by paper mills often are the means of obtaining credit. The institute not only trains men for the paper chemistry field, but also aims to



In Hawaii--

Hawaii, land of surf-riding, pineapples, steel guitars, and—Biggs digesters. The illustration is of a Biggs installation at the Ola Sugar Company, Hilo. The Biggs organization did not erect these 14-foot rotaries, but it does offer complete erecting service in all parts of the United States and Canada.

Biggs Paper Mill Equipment Is Standard All Over the World

Welded or Riveted Equipment Built and Erected by Biggs is Used All Over the World for Cooking and Bleaching Straw, Grass, Bagasse, Wood Fiber, Cotton Linters and Other Materials in Manufacturing Paper, Boxboard, Strawboard, and Similar Paper Products.

IN Hawaii, Japan, Australia, China, Canada, the United States—throughout the paper world—Biggs-built rotary, tumbling, sulphate and sulphite digesters are regarded as standard equipment. Biggs electrically welded digesters are accorded the same confidence as has been given Biggs products for more than forty years. They are accepted by all the leading insurance companies without limitation as to size or working pressure. Their out standing achievement is the elimination of maintenance in the chestnut chip and similar special proc esses in which expansion and contraction bring about excessive strain.

Welded Digester of Enduro KA2-S
Biggs fabricates in Enduro, Allegheny Metal, Stainless Steel, Monel, and other non-corroding alloys.

The utmost uniformity, safety, and dependability are assured in Biggs electrically welded vessels. Their completely satisfactory performance arises out of the stable character of the Biggs weld, which countless tests have proven to be actually *stronger than the plate itself.*

Whether your requirements are for welded or riveted construction, for globe, cylinder, tumbling, or stationary types, Biggs' experience and facilities will be of value to you. May we outline the Biggs story by sending you our pictorial folder, "Unusual Steel Plate Construction"?

THE BIGGS BOILER WORKS COMPANY, AKRON, OHIO
New York Detroit

BIGGS ROTARIES *for years of dependable cooking and bleaching...*

Biggs Welded Rotary Digester

Biggs Erects Rotary Digesters

Standard Cylinder Rotary Bleaching Boilers

Tumbling Digester Built by Biggs

Among Biggs Installations Are:

Akron Paper Co., Akron
American Straw Board Co., (10 plants), Akron
Antioch Paper Co., Antioch, Calif.
Australian Paper Mills, Sydney, Australia
Ball Bros. Co., Noblesville, Ind.
Beckett Paper Co., Hamilton, Ohio
Beloit Box Board Co., Beloit, Wis.
California Paper & Board Mill Co., Antioch, Calif.
Celotex Company, New Orleans
J. G. Cherry Co., Tama, Iowa
Cleveland-Akron Bag Co., Cleveland
Consolidated Water Power & Paper Co., Appleton, Wis.
Diamond State Fibre Co., Bridgeport, Pa.
Empire Paper Co., Vincennes, Ind.
Fibre Board Products, Inc., Stockton
Fir Tex Insulating Board Co., St. Helens, Ore.
Fox Paper Co., Lockland, Ohio
Fuji Paper Co., Tokio, Japan
Harriman Co., Harriman, Tenn.
John H. Heald Co., Lynchburg
Herman Garbe, Shanghai, China
Hinde & Dauch Paper Co., Sandusky, Ohio; also Fort Madison, Iowa
International Alcohol Corp., Fullerton, La.
Kalamazoo Paper Co., Kalamazoo
Maizwood Prod. Co., Des Moines
Marshall Bros., Inc., Yorklyn, Del.
Marshall Paper Co., Turner Falls, Mass.
Montreal Paper Co., Sorel, Quebec
North Star Mfg. Co., Coffeyville, Kan.
Port Huron Sulphite & Paper Co., Port Huron, Mich.
River Raisin Paper Co., Monroe, Mich.
Roanoke Fibre Board Co., Roanoke Rapids, N. C.
Peter J. Schweitzer, Elizabeth, N. J.
Southern Extract Co., Knoxville, Tenn.
Standard Paper Mfg. Co., Richmond
Sylva Paper Board Co., Sylva, N. C.
United Paper Board Co., New York
Weis Paper Mill Co., Quincy, Ill.

serve as a research bureau of importance to the paper industry and to maintain the most complete reference library possible. It has an annual appropriation of $60,000 for its maintenance.

The Wisconsin Manufacturers Association has elected as one of its vice-presidents D. Clark Everest, vice-president and general manager of the Marathon Paper Mills Co., Rothschild. J. M. Conway, president and general manager of the Hoberg Paper & Fibre Co. is a member of the association's board of directors.

Mrs. J. A. Kimberly passed away late in February at Redlands, Calif. She was the widow of J. A. Kimberly, one of the founders of the Kimberly-Clark Corporation, Neenah, Wis. The body was conveyed to Neenah for burial.

❖ MICHIGAN ❖

Drying Formula Explained to Technologists

At the February meeting of the Paper Technologists Club, held at the Columbia hotel, Kalamazoo, D. W. McCready, professor of paper chemistry and engineering at the University of Michigan, presented a summary of the research work planned for this spring at the University.

The proposed work is based on the mathematics of drying as outlined by Sherwood in an article which appeared in **Industrial and Engineering Chemistry** for February, 1929. In this article which was a degree thesis, Mr. Sherwood had propounded a formula for adiabatic drying.

The formula was explained by Mr. McCready in quite some detail and with generous use of blackboard and chalk. Although it is intended to apply strictly to air drying, Mr. McCready states that it will apply equally as well to cylinder drying because the biggest problem or factor is in getting the heat through the air space between the sheet and dryer and through the sheet. Compared to the total energy expended in the above parts of the process, the energy lost by having water in the dryer is almost negligible. This is direct contradiction to some theories propounded by certain persons and which have been previously presented before the club. Therefore, the members are awaiting with interest, the results of the research work to be carried out in an effort to prove or disprove the formula presented.

Two students will work on the problem and their results are to be presented as part of the program at the time of the Interstate Meeting which is to be held in Kalamazoo on May 22 and 23. At that time the discussion of the formula will be repeated together with the results of actual application.

The second speaker introduced by Mr. Bardeen, president of the club, was Mr. J. P. Strasser of the Stein Hall Manufacturing Co.

Mr. Strasser stated that the starch manufacturers have been conducting research for 25 years and the progress seems rather doubtful. Originally, the papermakers used only potato starch but that was superseded by corn starch due to corn having a much larger quantity of starch in proportion to its weight and the corn crop has become a major crop.

The extraction of the starch is much more complicated from corn than from potatoes or tapioca. The latter contain what is called free starches which can be removed by grinding and washing. The corn contains seed starch which is harder to remove. The kernels must be cracked, soaked and the germ removed.

There is some opposition to starch in the beater and its value is being questioned by some but nevertheless it is being used quite extensively for that purpose and is increasing in use in papers which are to be printed. Starch will keep down the fuzz which is very detrimental on printing papers and it will also increase the retention of clays.

Although starch has no greaseproof or waterproof qualities in itself, it was found by experiment that a glassine sheet, tub sized in starch had its grease resistance increased from six to 60 hours time.

It has been found that starch will increase the finish materially by filling up the hills and dales when used as tub sizing, and when used in the beater on waterleaf sheets it was found to increase the finish, bonding of the fibers, porosity of the sheet and the density. Due to the fact that the starch is expected to act as an adhesive between the fibers, and further due to the fact that this adhesiveness or binding will require the presence of water, Mr. Strasser says that by all means we should use a cooked starch.

Starch is no aid in tests ordinarily applied to bond or writing papers from the standpoint of sizing. It will aggravate the ink-flotation test, but it has been found that printing papers require an entirely different type of test and considerable work is being done to develop these new tests.

Synchronous Motors Subject at Engineers Club

The Chief Engineers club of Kalamazoo, had for its guest speaker in February, a representative of the Elliott Manufacturing Co., Jeanette, Pa., who spoke on Synchronous Motors.

The synchronous motor is the most interesting type in use today and was introduced to the field in 1913; therefore, it is the baby of the motor family.

The discovery of this interesting motor was by accident, as most discoveries are, and the first ones built would not start themselves, an auxiliary motor being necessary to provide the necessary starting torque. There was a gradual development in the method of winding to make them start themselves and at present these motors are built so they will start under full load. This development, of course, has been in the form of combining two motors in one. The latest types of synchronous motors are built with slip ring starting characteristics which throw out when the motor gets up to speed and the load is taken over by the synchronous winding.

Developments have been so great that it is possible now to get greater adaptation from the synchronous motor than from the usual type on the market. Due to these developments, the field of application for the new motor is ever widening and the motor, due to the starting characteristics which have been incorporated is enjoying a rapidly growing popularity.

The induction motor has a lagging power factor and this is the very point where the synchronous is gaining it popularity. At full load, the power factor of the induction motor is quite high but as the load drops off, the power factor falls rapidly so that the expense of operation is much higher at light loads, and this fact causes operators to buy undersized motors and operate at full load or excess load all the time and this is destructive to the motor. The synchronous motor is affected the opposite from the induction motor in that the power factor is very high at low loads and drops off slightly at full load or overload. This characteristic makes it possible to use a motor slightly oversize and then operate at low load. The power factor is raised and the cost of replacing motors is eliminated or greatly reduced.

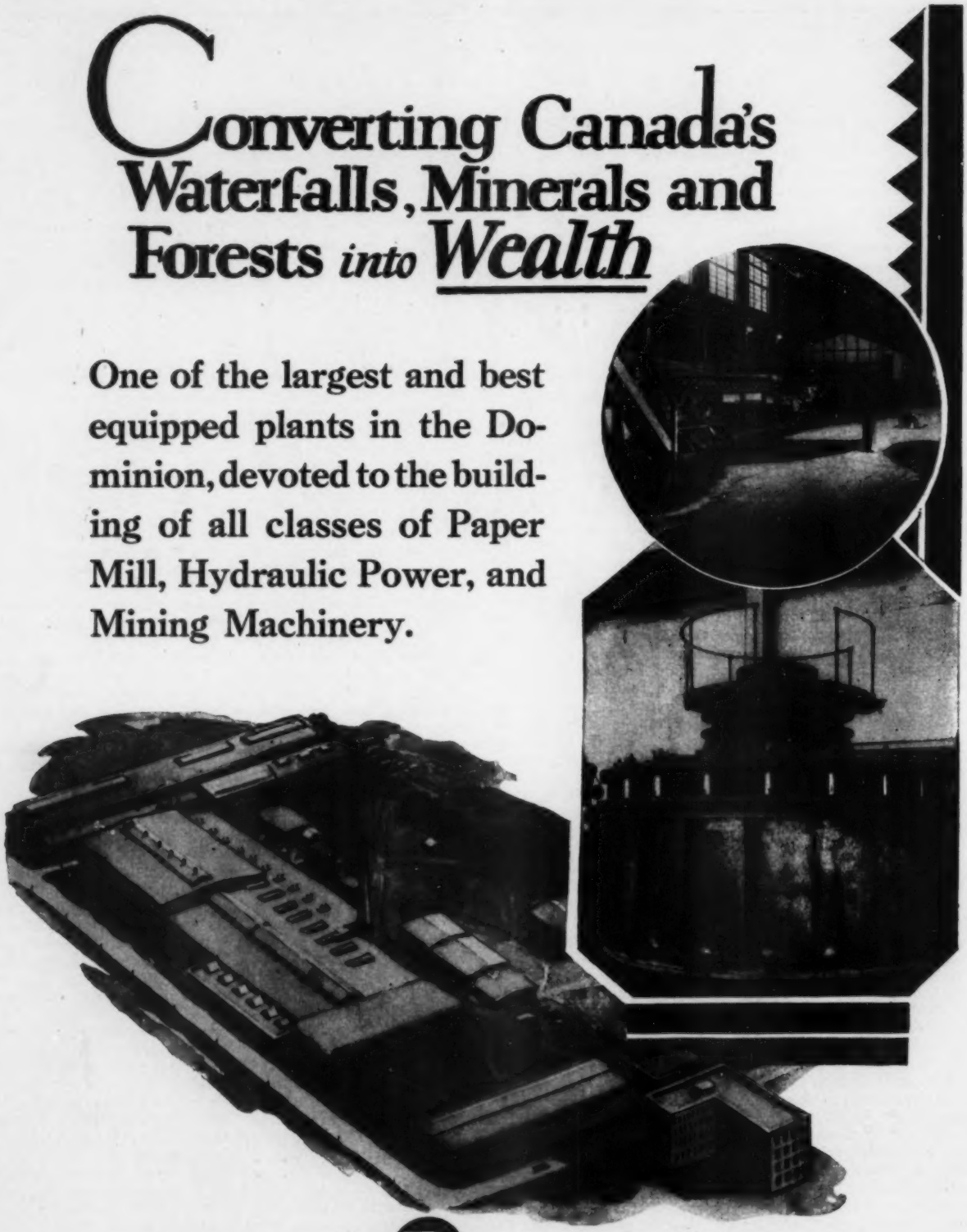
Due to the characteristics noted about the synchronous motor is said to be the most efficient motor built today.

Some interesting methods of application of the synchronous motor were brought out in the sales talk. At present this type of motor is being used to run motor generator sets and one installation which was made possible by the combination of the slip ring characteristics is on a direct connected drive for a chipper in a pulp mill. The load on this chipper varies from zero to 250 per cent and back to zero. By the new combination of characteristics, it is now possible to slow the motor down for a time, although the motor will then be operating on the slip ring portion and the power factor will be in accordance with that type operation. The advantage is in having two motors in one; as soon as speed is resumed the motor goes back to synchronous type and the power factor will drop again.

The Fuller Lehigh Company announces that effective March 1, the general offices of the company are removed from Fullerton, Penna., to 85 Liberty street, New York, N. Y. The manufacturing operations formerly carried on at Fullerton are transferred to Barberton, Ohio.

Converting Canada's Waterfalls, Minerals and Forests *into* Wealth

One of the largest and best equipped plants in the Dominion, devoted to the building of all classes of Paper Mill, Hydraulic Power, and Mining Machinery.



DOMINION ENGINEERING
MONTREAL Works Limited CANADA

Canadian News

Protest Against High Freight Rates

At the annual convention of the Canadian Pulpwood Association, held recently in Montreal, representatives from Fort Michigan to Halifax were unanimous in the opinion that Canadian railroads' high freight rates were throttling their business and that, unless these rates were immediately and substantially reduced, not only would the pulpwood business be lost to the country, but the railroads themselves would suffer by reduced earnings to the extent of several million dollars.

Examples of the tremendous burden pulpwood shippers are forced to carry under present rates may be judged from the following reports of members: (1) Out of the gross returns received by one of the largest shippers in the Association for wood delivered to a United States mill, 65 per cent is paid to the railroads in freight. (2) To one of the producers in the Cochrane district the value of a carload of wood at shipping point is about $112, while the freight to the United States border alone is $150.

It is held by the members that freight rates on pulpwood are altogether out of line with freight rates on other low cost raw materials. Commodity values generally have dropped tremendously in the past few years, labor has had to come down and freight rates must be correspondingly reduced if Canada is to continue to hold her export trade in this commodity.

The following officers were elected for the present year: president, Walter H. Russell, Port Arthur; vice-presidents, Armand Auger, Quebec; Ralph P. Bell, Halifax; Major T. A. MacLean, Greening, Que.; Jas. Thompson. Toronto. Executive officers: J. O. Auger, Quebec; E. A. Bell, Fort William; C. E. D'Auteuil, Quebec; Joseph Grogan, Quebec; George S. Kerr, Campbellton, N. B.; J. O. Amyot, Quebec; T. P. Altimas, Montreal; F. W. Perras, M. P., Gracefield, Que.; W. Roy Smith, Annapolis Royal, N. S.; Gordon W. Jones, Bancroft, Ont.; A. E. Wicks, Cochrane, Ont.

Newsprint Mills Operating at Record Low Rate

Production of Canadian newsprint mills during the month of January amounted to 184,339 tons, which contrasts with 206,955 tons in January of last year and 184,755 tons in December, 1930, the decrease from the corresponding month of last year corresponding to 11 per cent. The operating ratio of the Canadian mills dropped to a new low during January, operations being at the rate of 57.3 per cent of capacity, which compares with 59.5 per cent in December and 71.5 per cent in January, 1930 and an average ratio of slightly under 70 per cent during the whole of 1930 and of 85 per cent in 1929.

The exports of Canadian newsprint in January amounted to 153,362 tons, valued at $8,641,937, showing a sharp drop from the previous month when they were valued at $12,469,546, and an almost equally severe decline when compared, more logically, with the corresponding month of last year, when they were valued at $11,609,926. Total exports of pulp and paper in January were valued at $11,390,293, a decrease of $4,003,065 from the previous month and $4,616,049 lower than in the same month of last year.

U. S. Places Embargo on Russian Wood

A Treasury order issued by the United States Government on February 10, and placing upon the Russian Government the burden of proving that its lumber and pulpwood from four districts in the forest section of Northern European Russia are not the products of convict labor, has virtually the effect of barring Russian lumber and pulpwood from the United States market.

The order is of peculiar interest to Canada, whose trade in these products with the United States has been offered direct competition by exports from Russia. Imports to the United States from Russia for the calendar year 1930 ran to about 70,000.000 feet of timber and 150,000 cords of pulpwood. Inasmuch as imports from Canada were roughly 1,000,000.000 feet of timber and 1,500,000 cords of pulpwood, it is obvious that immediate competition was not serious insofar as quantity went; but the use of Russain pulpwood in the United States has had a considerable psychological effect upon the Canadian trade. Moreover, it has been estimated that within a few years, provided the Soviet five-year industrialization plans were successful, imports from Russia might run to 500,000,000 feet of timber, with a corresponding increase in the pulpwood figures.

It is expected, however, that the Treasury order having been issued upon affidavit which was not made public, the exporters will carry the matter to the courts. There is therefore no guarantee that the order will remain in effect indefinitely.

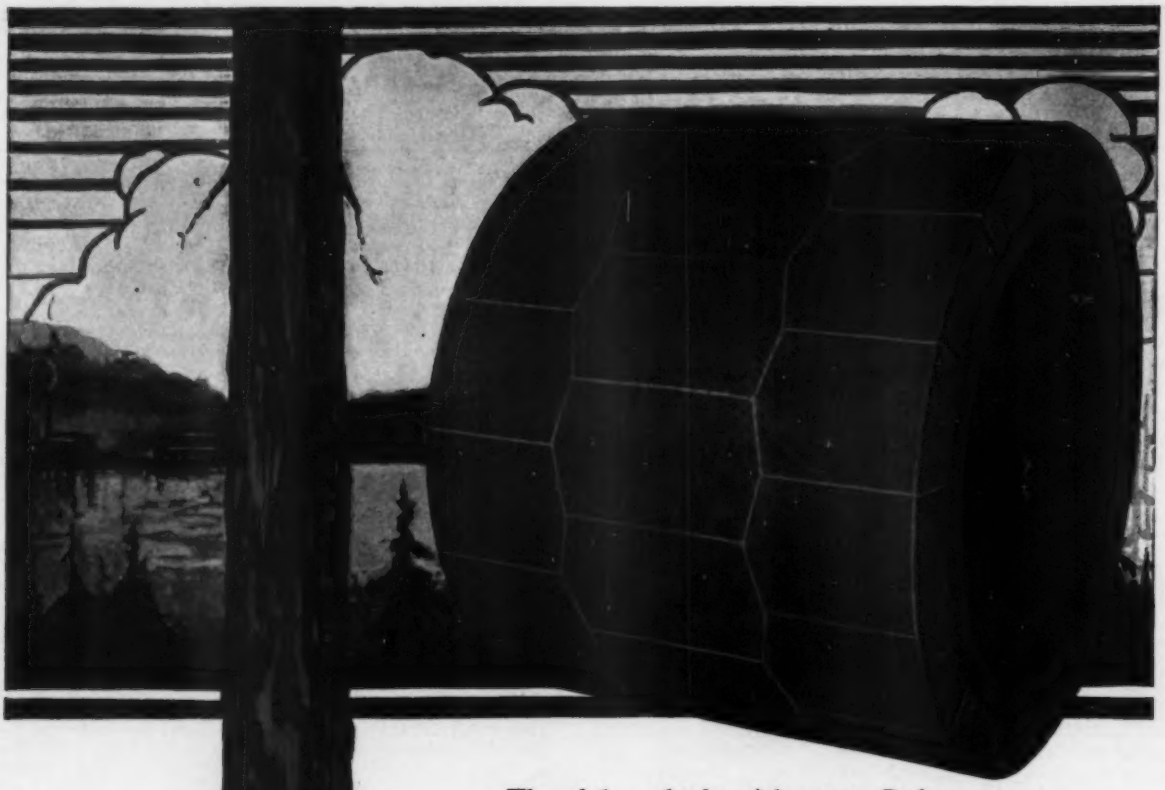
Though the Canadian agency for the Delthirna sizing process was opened only two years ago, already seven installations have been made in Canadian mills with very satisfactory results; and an eighth installation is being put in at the Toronto plant of the Dominion Boxboard Co. The following mills have had the system installed: the Beauharnois, Que., Cornwall, Ont., and Crabtree, Que., divisions of Howard Smith Paper Mills; the Dominion Paper Co.'s plant at Kingsey Falls, Que.; the St. Jérôme mill of the Rolland Paper Co.; the East Angus mill of the Brompton Pulp and Paper Co.; and the plant of the Don Valley Paper Co., at Todmorden, Ont.

The Pulp and Paper Magazine's "Safest Mill in Canada" contest, which is held during the last six months of the year and in which most of the Canadian pulp and paper mills compete, came to a close on December 31 last. It is very gratifving to note that there were only two fatal accidents, both of which occurred in Class A mills, as against three last year; and also that three mills completed the contest with a clean sheet having had no accidents involving lost time. The Sturgeon Falls Division of Abitibi Power and Paper Co. won the trophy for Class A mills with no lost-time accidents. In Class B. both the Thorold Division of Provincial Paper and the mill of the Don Valley Paper Co. completed the contest without having lost any time due to accidents; as the Thorold mill has the largest total of payroll hours, it wins the trophy for the Class B mills.

Canada Bans Russian Imports

By an order-in-council passed at Ottawa on February 27, imports of goods from Russia into Canada are banned. An official statement issued on the same day, in its concluding sentences roundly condemned the philosophy and practice of government in Russia, and while no date as to the effectiveness of the order was mentioned, it is assumed that it went into force imediately on proclamation in the following issue of the Canada Gazette.

The products banned are: coal, pulpwood, lumber, timber of all kinds, asbestos and furs, whether imported directly or indirectly. The reasons given for the action are that there is forced labor in the cutting and transport of timber and the mining of coal in Russia, that political prisoners are exploited, that the standard of living is below any level conceived of in Canada, and that, broadly speaking, all employment is in control of the communist government which seeks to impose its will upon the whole world.



The life of the Norton Pulpstone is measured in years instead of months

The Result:

- Less Burring
- Less Attention to Setting of Pockets
- Less Waste
- Uniformity of Pulp
- Slower Reduction of Diameter thereby Maintaining Production

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Worcester, Mass.

Canadian trade supplied by
Norton Company of Canada, Ltd.
Hamilton, Ontario

Grinding Wheels
Grinding Machines

NORTON
PULPSTONES

Refractories - Floor and Stair Tiles

QUEBEC

Dominion Engineering Profits Reduced

The annual report of the Dominion Engineering Works shows a reduction in profits at $557,252, against $924,143 in the preceding year, and a net profit of $353,639, or $3.17 a share on the common, against $709,491 in the preceding year, or $5.67 a share. Accordingly, a deficit was shown after payment of the year's dividend, totalling $500,000, and the company's profit and loss balance was reduced to $1,322,669. The company's working capital position, however, was strengthened during the year, current assets at December 31, 1930, standing at $3,084,364, and current liabilities at $800,953, leaving net working capital at $2,283,411, against $2,258,316 at the end of 1929. Featuring the balance sheet are: an increase in bonds and securities held to $1,497,633 from $1,017,138; a reduction in call loans from $1,350,000 to $850,000; a decrease of over $500,000 in accounts receivable, and among liabilities, a decrease in accounts payable from $1,173,819 to $675,953.

At the February meeting of the board of directors, a quarterly dividend of 60 cents per share was declared on the capital stock of the company, being payable on April 15 to shareholders of record on March 31. This places the stock on an annual dividend basis of $2.40 per share and contrasts with an annual rate of $4 per share heretofore. The dividend for the current quarter is generally declared at the March meeting of the board, but action was taken at the February meeting in order to allay various rumors that had been current regarding probable passing of the dividend.

It has been announced that Norman J. Dawes and J. A. Mathewson, K. C., have been appointed to fill two vacancies on the board of directors.

Dr. Allan C. Hill, of the research department of the Laurentide Division, Canada Power and Paper Corp., has resigned his position to take up a similar one with the Scott Paper Co., Chester, Pa. Before leaving Grand'Mère, he was guest of honor at a dinner party held at The Inn in his honor by his business associates and friends.

Earnings of Canadian Power and Paper Investments Decline

The annual report of Canadian Power and Paper Investments, Ltd., which was made public last month, showed an expansion in revenue at $329,607, but due to a net loss of $5,668 on sale of securities, against a profit in the preceding year of $241,012, the company's gross earnings for the full year were $323,939, compared with $516,218 in 1929, and $468,507 in 1928. Expenses totalled $45,446, taxes $1,517 and debenture interest $125,000, leaving net profits for the year at $151,975, from which preferred dividends, totalling $125,000, were deducted, leaving a surplus applicable to the common of $26,975, or $0.27 per share, against $250,632 in 1929, or $2.51 per share. The profit and loss balance now totals $547,367.

It is understood that at separate meetings of the boards of the subsidiary companies of the Canada Power and Paper Corp., held in Montreal last month, it was decided to pass the dividends on the preferred stocks of the Belgo-Canadian Paper Co., the Port Alfred Pulp and Paper Corp. and the St. Maurice Valley Corp. This action was not unexpected in view of the difficult conditions existing in the newsprint industry and the consequent necessity for rigidly conserving the cash resources of the companies concerned.

Information of much interest to the pulp and paper industry at large is contained in a lengthy communication recently submitted by the Canada Power and Paper Corp. at the request of the Montreal Stock Exchange. For instance, it is shown that the project for the establishment of a 1,000-ton newsprint mill in the Gander Valley in Newfoundland has been postponed for an indefinite period owing to the present unsettlement in the industry. This comes as good news for Canadian producers who have been looking askance at Newfoundland newsprint mills which are running regularly at over 100 per cent capacity and constantly increasing output. A further addition of 1,000 tons per day to Newfoundland's productive capacity would work havoc with Canadian competition.

It is also revealed that it was due to the postponement of this project that Canada Power and Paper secured the Hearst contract. Through an exchange of stock, Canada Power and Paper secured an interest in the Dominion Newsprint Co., which was fostered by the Hearst interests and formed for the purpose of carrying through the Newfoundland project. The Hearst buying organization had a contract with the Dominion Newsprint Co. covering all the Hearst requirements for newsprint for 15 years. This contract has been taken over by Canada Power and Paper, and will come into effect in 1934. The company's letter to the Montreal Stock Exchange refers to this in stressing the favorable long-term outlook of the company. Although the definite tonnage is not stated, it is understood that the Hearst requirements run to around 540,000 tons per annum.

The E. B. Eddy Co.'s third annual coast to coast convention was held in Hull on February 4, 5 and 6. The three days were devoted to a thorough discussion of the problems and policies of the company. One of the features of the gathering was the presentation of a very handsome grandfather clock to John F. Taylor, secretary and sales manager, to mark the completion of 50 years of service with the company.

Maclaren to Develop Quarter Million Horsepower

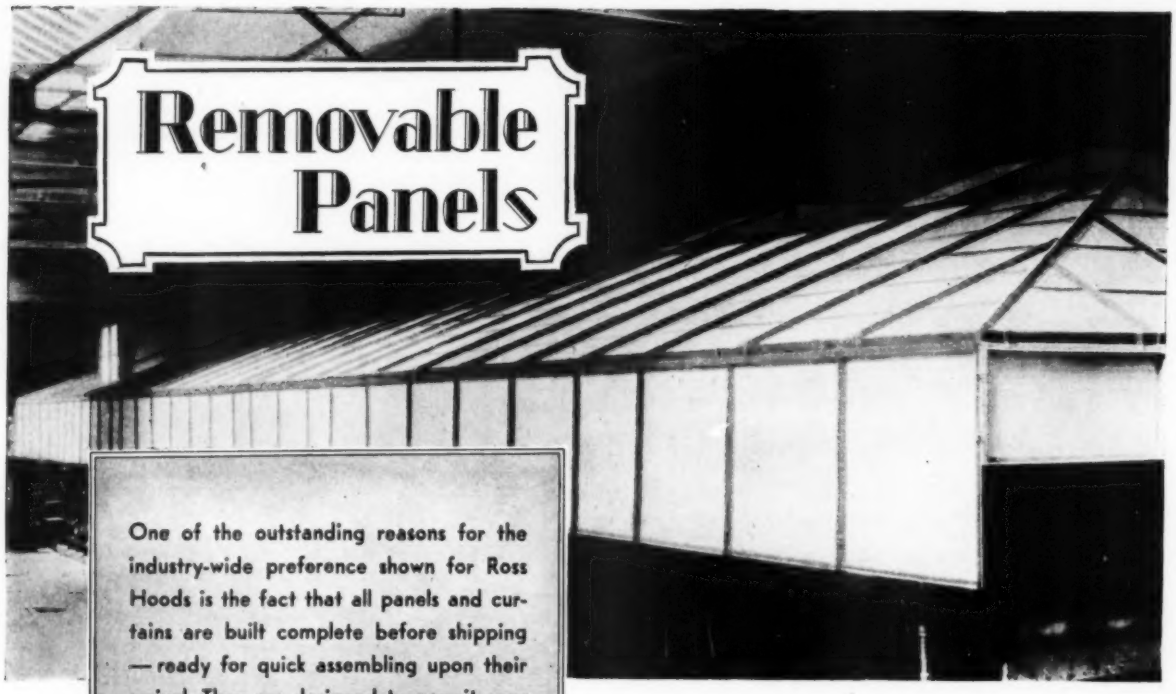
The James Maclaren Co., Ltd., has awarded the general contract for the construction of the Masson Falls power development of the Maclaren-Quebec Power Co. to the Foundation Co. of Canada.

The new power development, with an installed capacity of 130,000 hp. operating under a head of 185 feet, will be an important addition to the hydroelectric plants of the Province. The work will consist of a dam, control works and intake on the Lièvre river, and a tunnel 25 feet in diameter inside the concrete lining and over a mile long, driven through solid rock at a depth of about 200 feet below the surface, through which the water will be led to the power-house, discharging through a tail-race into the river about a mile and a half below the dam. The power-house will be a brick and concrete structure housing four units, and located adjacent to this will be an outdoor switching and transformer station. The work has already been commenced and the plant is to be completed ready for the delivery of power by July 1, 1933.

The development of power by the company is concentrated at two sites, at High Falls, where 86,000 hp. are already installed and provision has been made for the installation of an additional 29,000 hp. and at Masson Falls, the site of the projected 130,000 hp. development, completion of which will give the company an installed capacity of 245,000 hp.

Practically the whole output of the new plant has already been disposed of, the Hydro-Electric Power Commission of Ontario having contracted for a supply of 125,000 hp. The first block of power is to be delivered by July 1, 1933, with increasing quantities annually until the full amount has been taken by November 1, 1936. When full delivery of power is being made by the Maclaren plant in 1936, the Quebec area within a 30-mile radius of Ottawa will be supplying more than 500,000 hp. to the Ontario Hydro Commission, as the Gatineau Power Co. already supplies 380,000 hp. on long-term contracts.

The initial financing of the undertakings has taken the form of an issue of $12,000,000 series A, 5.5 per cent, first mortgage bonds of Maclaren-Quebec Power Co. The bonds are secured by a first fixed and specific mortgage upon all the real and immovable properties and right of the company now owned or hereafter acquired, the company's power contracts with the Hydro-Electric Power Commission of Ontario and with the James Maclaren Co., and the company's reservoir rights; and they will also be secured by a first floating



Removable Panels

One of the outstanding reasons for the industry-wide preference shown for Ross Hoods is the fact that all panels and curtains are built complete before shipping — ready for quick assembling upon their arrival. They are designed to permit easy removal or replacement — one or more — at any time, without disturbing balance of hood.

And this important advantage is but one of many exclusive features that accounts for the popularity of Ross Hoods. Built of Transite Asbestos-Lumber and structural steel, they are protected against fire and corrosion. Cost of upkeep is almost negligible. They are designed to avoid interfering with normal operation of machine and they permit easy access to dryers at all times.

Only a hood with these combined advantages can be economically practical.

ROSS PAPER MACHINE HOODS

A Ross Hood can be erected during a week-end shutdown. Write for illustrated bulletin giving complete details. No obligation.

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charge on the undertaking and all other assets of the company.

J. T. Ayers

In the passing last month of John Thomas Ayers, the paper industry lost another of its esteemed friends. Mr. Ayers had been ill for sometime, but it was hoped that his recent visit abroad had restored his health.

Mr. Ayers was in his 56th year, having been born in Hawkesbury, Ont., on May 15, 1875. Upon the completion of his education in the schools of Hawkesbury, Lachute and Berthier, Mr. Ayers entered the firm of Ayers, Ltd., which his father had founded in 1870. After a training in all departments and the different branches of the concern, he rose to the position of vice-president and general manager and on the death of his father, in 1916, he was appointed to the position of president which he held at the time of his death. Under his administration the company made rapid progress and at the present time is making shipments of its products to the four corners of the earth. The company has been a pioneer and leader in the felt industry in this country, and it might be mentioned that Mr. Ayers gave the matter of papermakers' felts his close attention at all times.

Mr. Ayers is survived by two brothers, Harry Ayers and Ernest F. Ayers, both of Lachute.

Carl Jentz, formerly sulphite superintendent at the Cap de la Madeleine Division of Canada Power and Paper Corp., has joined the staff of the St. Lawrence Paper Mills, Three-Rivers, as sulphite expert.

Satisfactory Earnings by Building Products

Reduction in profits was shown in the annual financial report of Building Products, Ltd., for the year ending December 31, 1930, attributable to the reduction in construction activities during the year. Net profits were shown at $326,434, against $418,482 in the preceding year. Deduction of common dividends at $241,692 left a balance of $84,472 to be added to profit and loss account, which is now carried on the balance sheet at $934,649. Earnings on the combined A and B common stock were equal to $2.70 against $3.41 in 1929. The company's working capital position was improved from $1,598,548 at the end of 1929 to $1,827,925 at the end of 1930; and the total assets from $2,931,700 to $3,211,572.

According to President Phillip R. Allen, in view of the generally unfavorable conditions which prevailed during 1930, the record attained by the company is quite satisfactory. Through the addition of new lines, such as improved types of asphalt shingles, a new siding for the outside walls of buildings, insul board and fiber shipping containers, the sales were well maintained. At the present time a plant is being erected at Hamilton, Ont., for the manufacture of premoulded asphalt plank and flooring, which has not heretofore been made in Canada.

Donnacona Profits Lowered by Adverse Conditions

The annual financial statement of the Donnacona Paper Co. for the fiscal year ended December 31 showed a sharp reduction in earnings from 1929, but with bond and debenture interest earned with a margin of only $1,178, which left the company unable to provide for depreciation and depletion for which account $201,956 had been set aside the preceding year. As pointed out by President J. H. Price in his remarks, the poor showing on the year was altogether the result of the adverse conditions in the industry.

Net earnings for the year were $621,190, against $829,801 in 1929, and $869,762 in 1928. Interest absorbed $620,012, leaving a balance on the year, before depreciation and depletion, of $1,178, against $2,905 in the preceding year. Surplus was brought forward at $65,275, leaving a net profit and loss balance of $66,453. The company's working capital was slightly lower at the close of the year at $678,028, against $771,181 at December 31, 1929.

In the balance sheet fixed assets are $500,000 higher at $15,625,589; accounts receivable are higher, while inventories show an increase of fully three-quarters of a million. Bonded indebtedness increased $452,000 to $11,452,000, while new items are a bank loan of $640,000 and a bank overdraft of $127,012.

The company completed construction of its insulating board mill during the early part of the year. It has been in successful operation since then, and while domestic sales of the new mill products have exceeded expectations, foreign sales have been slower but promising. It is expected that during the current year satisfactory profits will be derived from this source.

The annual report of the Rolland Paper Co. for the year ended December 31, 1930, shows the results of the company's operations to have been satisfactory in view of the general business conditions. Earnings, after operating expenses, all taxes and provision for bad and doubtful debts, amounted to $379,358, as compared with $440,480 for the previous year, and were equivalent to 2.75 times bond interest. After deducting the usual provision of $72,000 for depreciation, the net earnings available for dividends were $169,858, as compared with $230,980 for 1929. The 1930 net earnings were equivalent to 1.88 times the dividend requirements of $90,000 on the company's six per cent preferred shares. After deduction of preferred dividend and proportion of organization expense written off, there remained a net addition to surplus of $69,858, as compared with $130,980 in the previous year, making the total profit and loss account as at December 31, 1930, $281,034.

The abnormally low level of the Ottawa river is forcing a curtailment of operations of a number of plants located in the vicinity of the Chaudière Falls and dependent on the latter for their supply of power. The present flow over the Chaudière Falls is estimated at 12,000 cubic feet per second, whereas a flow of 22,000 cubic feet is necessary to operate the various plants there at full capacity. Light rainfall last fall is blamed for the lowering of the river level.

Dr. E. R. Cameron, father of E. P. Cameron, director of the Pulp and Paper Division of the Forest Products Laboratories of Canada, at Montreal, died at Ottawa on February 1. The late Dr. Cameron had recently retired from the civil service after a long and successful career.

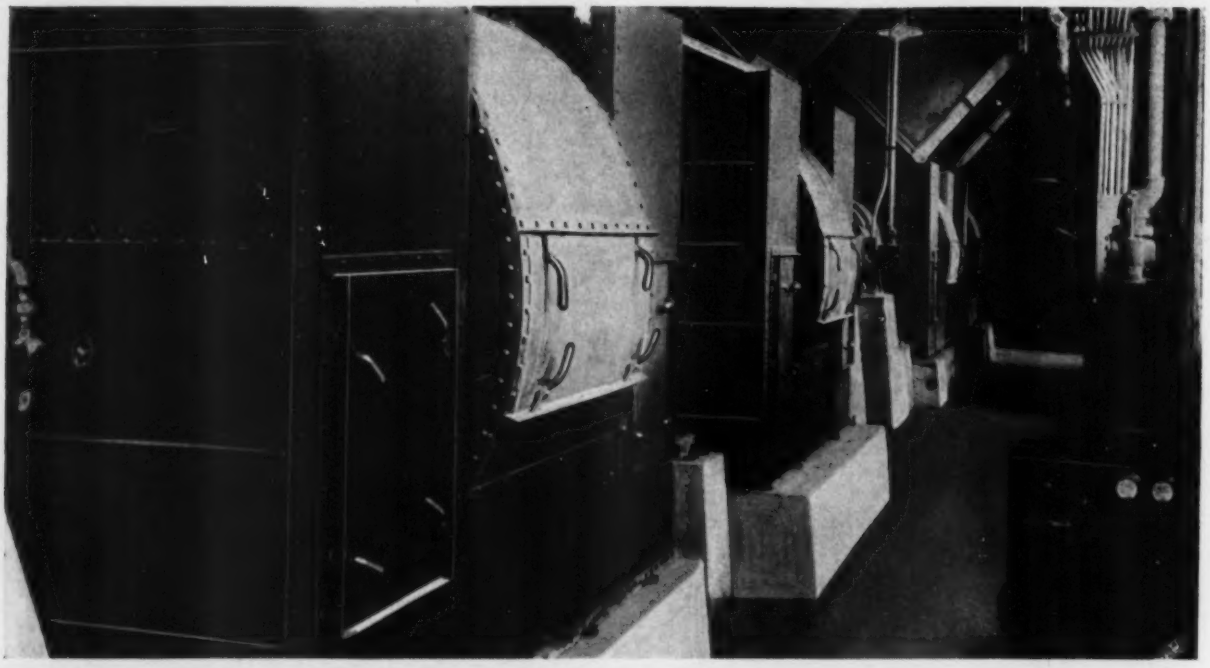
ONTARIO

Provincial Paper Year Satisfactory

The report of Provincial Paper, Ltd., for the year ended December 31, 1930, indicates substantial improvement in the general financial position of the company. Earnings for the year after charging depreciation were more than 3.25 times interest requirements on the company's funded debt. After depreciation and interest, earnings for the preferred dividends were equivalent to more than twice such dividend requirements for the year, and earnings available for the common amounted to over $2.70 per share.

Profits from operations for the year, before providing for depreciation and interest amounted to $995,747, against $1,086,087 in the previous year. From this there was deducted the sum of $250,000 for depreciation and $229,559 for bond interest, etc. The balance available for the preferred and common stock out of the year's earnings was $516,188. After payment of dividends on the $3,500,000 par value of 7 per cent preferred there remained available for the common $271,188, equivalent to approximately $2.71 per share on the 100,000 common shares. Surplus carried forward amounted to $672,430.

The balance sheet shows an improvement in the current position of the company which now stands at $2,208,510, as compared with $2,142,423 at the close of 1929. Current assets of $2,619,572 compare with current liabilities of $411,062. Cash on hand and in banks has increased from $243,687 in 1929 to $334,399. Accounts payable stand at $349,812 in 1930, as against $455,338 in 1929. The company invest-



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Wherever efficiency is the most important factor—you will find Buffalo Fans.

Why not let us help you with your heating and ventilating problems?

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ments show an increase from $630,577 to $839,940, which increase is represented entirely by purchases of the company's bonds made in advance of sinking fund requirements. The depreciation reserve is up from $1,000,000 to $1,250,000.

During the month of January the mill of the Spruce Falls Power and Paper Co. at Kapuskasing operated three of its four paper machines and produced an average of slightly over 410 tons of newsprint per day, establishing a mill average equivalent to 547 tons per day on the four machines. This accomplishment is the more remarkable that the machines have a rated capacity of 125 tons per day each.

The Great Lakes Paper Co. at West Fort William recently made 327¼ tons of newsprint in a 24-hour period, which is 9½ tons greater than the previous record. The mill contains two paper machines, one of which, No. 2, is the largest in the world, having a wire 304 inches wide.

Annual Meeting of Toronto Carton Council

Bart Sproule, of Collett-Sproule, Ltd., was elected chairman of the Toronto Carton Council at the annual meeting and dinner held in the King Edward Hotel, Toronto. In response to invitations sent out by the council, many of the paper box makers throughout Ontario, included in the membership of the Canadian Paper Box Manufacturers' Association, together with a number from the paper and other allied trades, joined in the gathering and discussed various problems of the industry.

A generally optimistic view was taken of the outlook for 1931 and while general testimony was that the past year had been one of very hard going, with output and profits down, it was generally agreed that all signs pointed to the likelihood of gradual improvement in conditions early this coming summer.

A short test on the use of the rod mill for refining kraft knots was made recently by the Dryden Paper Co., at Dryden. Although only a very small sample of pulp (about 125 pounds of oven-dry fiber) was available, the result is said to have been very satisfactory. Funds have been made available which will permit the undertaking of an extensive test on the use of the rod mill for the beating and refining of a number of different grades of pulps, and it is hoped that the series of studies should assist materially in determining the proper sphere of the rod mill as a beating engine and refiner.

In spending $70,000 to fight a single forest fire in the Fort Frances area last summer, his department demonstrated the lengths it was prepared to go in protecting the pulp and lumber industries of the province by progressive measures, declared the Hon. William Finlayson, Minister of Lands and Forests at the convention of the Canadian Lumbermen's Association, which was held in Toronto last month. For more than 30 days, 250 men and 200 tons of equipment, aeroplanes and wireless sets had been employed in cutting down the fire, which, in 30 hours had spread across a 70-mile front in a district accessible only by air, the minister said. Last year the Government spent $2,000,000 on forest protection in contrast with $350,000 contributed by the lumbermen.

Abitibi Jottings

Following a shutdown of the Fort William Division of Abitibi Power and Paper Co., a delegation from the Council was appointed to interview the Government at Toronto in order to press for an early resumption of activities at the mill. General D. M. Hogarth, M. P. P. for Port Arthur, stated that the company was just as anxious to operate the mill as the people of Fort William were to see them operated. He said that the Minister of Lands and Forests had told him a short time previously that the cancelling of the limits, cash payment and $200,000 bond on the part of the Government would not help the unemployment situation. General Hogarth said that the only solution seemed to him to be the establishment of a central control which would allocate tonnage to every mill in the province, and that with such a system the mills at the head of the lakes would operate to capacity, with the great Middle West market as the demand to take care of the supply. The company also was interviewed by the delegation who were informed that the economic depression was the cause of the shutdown, and that the plant would be reopened just as soon as business warranted it.

Construction work on the 275,000-hp. development at Abitibi Canyon continues to make steady and satisfactory progress. The double-track steel bridge over the canyon has been completed and in use for a few weeks. Cement-pouring on the main dam is in progress. The work on the coffer dam on the upstream side is advancing well. One tunnel is completely trimmed to size and part of it cement-lined, and the form work is up on the remainder of this tunnel. The east tunnel is broken through and is being brought to full size. A good part of this work has been done, but the tunnel still has to be cement-lined. It is the intention to have both tunnels completed by April 1 in order that they may take care of the water as the coffer dam advances.

❖ BRITISH COLUMBIA ❖

Forest fires in British Columbia during 1930 did total damage assessed at $1,408,000, as against $941,738 in 1929 and $103,000 in 1928. Timber destroyed amounted to 390,000,000 feet, of which 25,000,000 feet may be salvaged, compared with a total loss of 272,000,000 feet in the previous year. Altogether, during 1930, 2,271 forest fires were reported, as against 2,188 in 1929. No fewer than 262 fires were started deliberately by incendiaries, virtually all of them being attributed to men seeking work in fire-fighting. As most fires were in districts where it was almost impossible to secure crews of fire-fighters, the season's operations were extremely difficult.

❖ NEW BRUNSWICK ❖

Lumbering Season Nearly Finished

The 1931 lumbering season in New Brunswick is rapidly drawing to a close and remaining activities concern chiefly the smaller operators. In all parts of the province, the large operators have finished work for the season two weeks ahead of the average time, and many of the crews have been laid off and the lumberjacks have returned home. It will be at least a month, and possibly six weeks, before driving is commenced.

A. T. Murchie, chief scaler of the province, who paid several visits to the lumbering sections during the winter, stated that the operators consider the season just closing to have been one of the best. Snow heavier than the average was experienced in every section except on the north shore.

❖ NOVA SCOTIA ❖

The Hinde and Dauch Co. of Canada is planning to establish a branch plant at Halifax for the manufacture of paper containers. It is understood the representatives of the company were recently in Halifax in connection with the arrangements for this new branch.

It has been announced by Colonel C. H. L. Jones, president of the Mersey Paper Co., of Liverpool, N. S., that his company has entered into a five-year contract with the Dominion Coal Co. for a supply of Nova Scotia coal involving 45,000 tons annually, with possible expansion to 85,000 tons.

ACCOMPLISHMENT

THE increasing use of chromium plate on paper mill equipment is accelerated by the excellent performance of CRODON-plated parts now in operation. The correct application of chromium plate is frequently the most reasonable—*and economical*—solution to problems involving wear and corrosion. Most metals may be plated with CRODON—the resulting surface is harder than steel, smoother than glass, strongly resistant to corrosion and unaffected by practically all acids.

THESE characteristics of CRODON spell economy to users of equipment to whom wear and corrosion means expense.

HERE are a few representative performances of CRODON-plated paper mill equipment:

Embossing Roll	**— 6**	**times**	**normal**	**life**
" "	**— 3.7**	"	"	"
" "	**— 2**	"	"	"
Printing Roll	**— 6**	"	"	"
Evaporator Tubing	**— 3.8**	"	"	"
Screen Plates	**— 4.2**	"	"	"

CRODON increased the average life of this equipment 4.3 times—*and every part was still in regular operation!* The operating economies are substantial: longer life, avoidance of equipment changes and replacements, fewer operating delays and assurance of an improved and maintained quality of product.

YOU cannot afford to disregard the advantages of CRODON. The experience of our organization and the complete facilities of our plants are available to you. Conveniently located and prepared to render exceptionally prompt plating service, our Milwaukee and Waterbury plants have become closely affiliated with the paper industry. Our engineers not only know your wear and corrosion problems—they can be of great assistance in finding a remedy. May we give you further information?

Write for our Bulletin No. 5;
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ENGLAND

News of the Paper Trade

The possible output of British mills increased last year by 100,000 tons; but the actual tonnage production has been rather less, for more than double the number of mill workers were out of employment last year, and the import of raw materials was 150,000 tons less. In spite of this indication of lower production in British mills, the imports of paper increased by over 41,000 tons.

Nearly all the increased capacity of British paper mills is in those specializing in newsprint. The larger mills with a productive capacity of over a thousand tons a week have kept reasonably busy, and only a few of the smaller mills have been short of orders. There was an increase in imported newsprint of over 6,000 tons above last year's figure, and from this it is seen that, in spite of the general depression of trade, there was a considerable increase in the consumption of newsprint throughout the country. Over 90 per cent of the paper imports scheduled under the heading Printings, are newsprint, and of this we imported 350,000 tons.

Canada and Newfoundland have considerably increased their business with the home country of recent years, although there was a drop of 16,000 tons last year in the imports from empire mills, and the imports from the continental mills increased 24,000 tons. The starting up of a new mill on the Mersey early in December of last year, making over 1,000 tons a week, has obviously displaced a similar quantity coming from other sources, and it is perhaps significant that in the returns for the same month there is a drop of 9,000 tons in the quantity of paper imported from Canada and New Zealand. During 1930, the import prices of newsprint from Continental mills has been lower than those obtained by Canadian, Newfoundland, or British mills.

There was a considerable decline in our exports of paper last year, and we dropped back well below the figures of two years ago. The actual decrease for the year was 39,500 tons, and the decline was general in all classes of paper, and applied to all countries except New Zealand. The trade depression in Australia accounted for two-thirds of the total decrease in our exports. From the review of last year's paper trade conditions in this country, the following are outstanding figures: Decrease in raw material imports, 150,000 tons; decrease in exports of paper of all kinds, 39,500; increase in newsprint imports, 6,000 tons; increase in imports of all kinds of paper, 41,500 tons; increase in productive capacity of British mills, 100,000 tons; increase in unemployment figure in British paper industry, 100 per cent.

Large Paper Exhibit at Industries Fair

The section at The British Industries Fair devoted to paper and stationery occupies much more space this year than it has done for several years past, and there are good representative displays of paper products and manufactured stationery. Some of the leading firms that have been absent from the fair for some years have again taken prominent stands, and there are a number of entirely new exhibitors. Displays of writing paper and envelopes in fancy boxes are much in evidence. Among the pure and simple paper exhibits are handmade note with natural deckled edges and in a range of delicate shades, and machinemade pure rag papers in bright white or pale cream. In this class there are not many exhibits but they are fairly representative. Robert Craig & Sons, Ltd. of Airdrie, Scotland, have a show of writings, blottings, and printings; John Dickinson & Co., Ltd., of Hemel Hempstead show some papers of their own manufacture as well as a good collection of fancy stationery; Bartons (Birmingham), Ltd., of Birmingham, display an extensive variety of cover papers, as well as a selection of photographic mounts and albums.

An interesting exhibit is cellulose wadding—paper treated in its early stages to form a substitute for cotton-wool. This was shown in two varieties—absorbent for all medical and sanitary purposes, and non-absorbent for use as packing for silverware and other tarnishable goods. A new type of decorative papers as a substitute for marbled papers was also shown. These have a wood-free or esparto body, and the process of manufacture is somewhat similar to the hand method of marbling; but it is done by machine. Continuous rolls can be produced and there are many delicate and attractive colored effects obtainable.

The British paper industry has suffered a serious loss in the death of A. W. Foster, B. A., who for 17 years was the secretary of the Paper Makers' Association of Great Britain and Ireland. Mr. Foster had carried out much valuable work for the Technical Section of the Association, and much of the progress made in that section had been due to his efforts. From 1903 to 1912 Mr. Foster was in practice as a lawyer, and has specialized in company law. He was a member of the executive committee and grand council of the Federation of British Industries, and was also a Fellow of the Royal Statistical Society.

Under the aegis of Lord Riddell, a new body known as The Printing Industry Research Association has recently been launched. The Council is to consist of a president, chairman, vice-chairman, honorary secretary, and honorary treasurer, and the articles of association provide for the inclusion of members representative of allied trades organizations including the Papermakers Association. The technical director of this organization will be Dr. G. L. Riddell, who although only 24 years of age is already well-known in technical circles of the printing trade. For a time he acted as an honorary secretary of the durability of paper committee of the Library Association. He has been invited to co-operate with the United States Bureau of Standards in their work on the standardization of offset papers.

NEW YORK CITY

Wood Pulp Importers Elect

George W. Oliphant, of Castle & Overton, Inc., 200 Fifth avenue, New York, was re-elected president of the Association of American Wood Pulp Importers at the annual meeting of that organization on February 5 in the St. Nicholas Club, New York. Orvar Hylin, of the Lagerloef Trading Company, Inc., was again elected vice-president; William H. Anders, of the Perkins-Goodwin Company, was re-elected treasurer, and Arthur J. Fox, of Castle & Overton, Inc., was elected secretary.

The Board of Directors of the Association for 1931 consists of the above four officers and Orval A. Wales, Johaneson, Wales & Sparre, Inc. Howard E. Atterbury, of Atterbury Brothers, Inc., was re-elected National Councilor, and Frank C. Overton, of Castle & Overton, Inc., was named Alternate National Councilor.

Annual Banquet Paper Mill Supply Dealers

One of the enjoyable events during the convention of the American Paper and Pulp Association in New York during the week of February 16-20 was the 23d annual banquet of the New York Association of Dealers in Paper Mills Supplies, Inc., on the evening of February 17 in the Hotel Commodore. An exceptionally large attendance, including many visiting paper mill executives, was at the dinner, the number present exceeding any previous annual banquet of the Association with the single exception of the 1920 dinner. An excellent seven-course repast was served, following which an entertaining program of vaudeville by an array of talented artists was rendered, the soloists, dancers, tricksters and others performing on an elevated stage at one side of the dining room affording a clear view to all in the hall.

The "old triumvirate" of the Association, composed of Banquet Committee Chairman Walter H. Martens, of George

PERKINS Roller Bearing Web Super-Calender

'No Calender can be better than the Rolls in it.'

Perkins engineers have built into this 7-Roll Roller Bearing Web Super-Calender the strength necessary for smooth, steady operation under the most severe working conditions. It is efficient in production, easy in operation and low in power consumption.

Complete information concerning this and other Perkins finishing machinery sent upon request.

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Ventilating Fans
Rag Cutters
Stock Cutters
Paper Dampeners
Bleach Ejectors

W. Millar & Company, Inc.; Secretary Alfred J. Moran, of A. J. Moran & Company, Inc., and Entertainment Committee Chairman Fred H. Chase, who long have had charge of the annual dinners of the organization, again effected arrangements for this year's dinner, and acquitted themselves glowingly, as is usual. The entertainment was especially good, and was enjoyed by all. Upwards of 250 paper stock dealers and their mill men guests were present.

Robt. Gair Co. Makes Donaldson President

E. Victor Donaldson was elected president of the Robert Gair Company, manufacturer of paperboard and paper containers with headquarters in New York City and mills in several localities in the East, at the annual meeting of that company on February 26, succeeding George W. Gair, who was re-elected chairman of the Board of Directors. Mr. Donaldson has been vice-president and general manager, and will continue his managerial direction in his new post.

The meeting also elected Edwin R. Marshall first vice-president. Mr. Marshall is executive vice-president of the First National Old Colony Corporation. The other officers and members of the Board were re-elected.

Mrs. Robert Gair

Mrs. Emma Eyre Gair, widow of Robert Gair, founder and former head of the Robert Gair Company, paperboard and paper box manufacturers with main offices in New York and mills in several parts of the East, died on February 10 at her home, 2 East Seventieth street, New York, at the age of 86 years. She was married in 1868 and lived most of her life in Brooklyn.

Mrs. Gair is survived by two sons, George W. and Robert Gair, Jr., both of whom are with the Robert Gair Company, and four daughters. Robert Gair died in 1927.

Charles R. McBride

Charles R. McBride, long prominently identified with the paper stock trade in New York City and one of the "deans" of the waste paper industry of the country, and a former president of the New York Association of Dealers in Paper Mills Supplies, Inc., died suddenly at his home in Richmond Hill, L. I., on February 26. He was but several months short of 70 years of age, having been born on June 10, 1861.

Mr. McBride was in the paper stock trade for more than 30 years, his last connection being with the Wilson Paper Stock Company, Inc., of New York, with whom he was associated for about 11 years. Prior to going with that concern he was for 14 years with the old George F. Hils Company, after having been in business for himself for about six years. A widow and a daughter survive.

The Box Board & Lining Co, 10 Grand street, New York, has been purchased by the Butterfield-Barry Co., 174 Hudson street, New York, and has been absorbed by the latter concern which will continue to operate the merged businesses under the name of the Butterfield-Barry Company at the present address of that company. Both concerns have long been prominent in the paper and boxboard trade of New York, and are among the oldest in the local trade. The Box Board & Lining Company was established 28 years ago by Daniel J. O'Connell and Thomas J. Moore, and since the retirement of Mr. Moore some years ago and the death of Mr. O'Connell several years ago, has been conducted by Mr. O'Connell's widow.

Foreign Paper Mills, Inc., manufacturers of paper mill equipment and accessories, have moved their offices from 72 Duane street to new and larger quarters at 314-316 Broadway, New York.

Announcement is made by Thomas W. Cole, sales manager of the Bayless Pulp and Paper Corp., with offices at 2 Lafayette street, New York, that James M. Denton, formerly

TITANOX-B

(Barium Base)

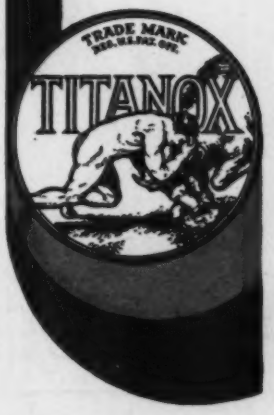
improves the opacity of "super" and coated stocks

IN their search for a better means of improving the opacity of paper stocks, leading manufacturers are investigating the superior characteristics of Titanox-B (Barium Base) as a filler and coating material.

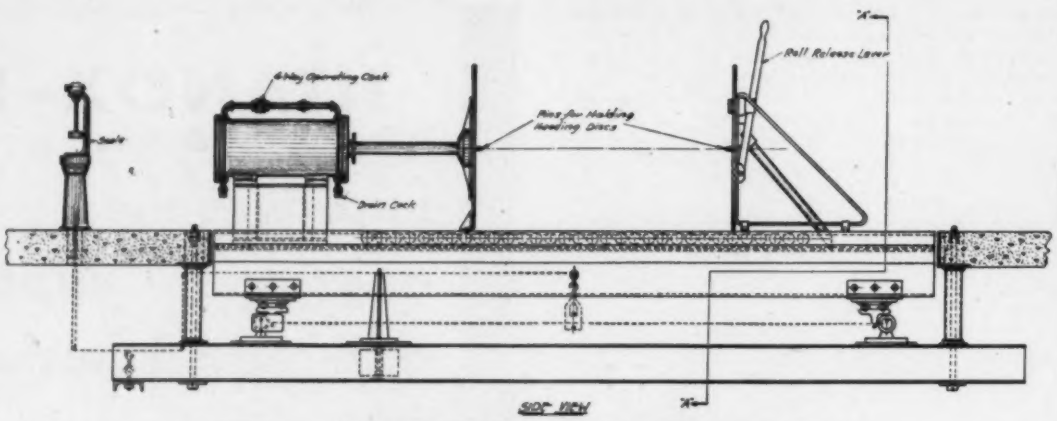
Among the properties which recommend its use in modern paper manufacture are exceptionally fine particle size; remarkable whiteness; high tinting strength; chemical inertness; high refractive index and moderately high bulking value. These characteristics of Titanox-B are proving helpful in improving paper quality, particularly from the standpoint of opacity.

Titanox-B is a true composite, opaque pigment—a white, fine, uniform powder consisting of titanium oxide precipitated upon and coalesced with barium sulphate (blanc fixe).

In some cases it has been found desirable to use Pure Titanium Oxide (TiO_2)—another of our products—instead of Titanox-B. It will be well worth your time to investigate Titanox pigments. Get in touch with our nearest branch for further information.



TITANIUM PIGMENT CO.
INCORPORATED
Manufacturers of
TITANOX-B (Barium Base) TITANOX-C (Calcium Base)
PURE TITANIUM OXIDE
60 John Street, New York, N. Y.
Carondelet Station, St. Louis, Mo.
Pacific Coast Distributor:
NATIONAL LEAD CO. of CALIFORNIA
2240 24th Street, San Francisco, Calif.
Canadian Distributor:
WILSON, PATERSON, GIFFORD, LTD.
101 Murray Street, Montreal — 132 St. Helen's Ave., Toronto



The MURRAY Header

THE illustration shows the Murray Heading Machine as supplied in combination with scale unit. With this equipment, heading and weighing is one simple operation, eliminating needless and costly handling.

This simple, versatile machine will turn out uniform, perfectly headed rolls at a fraction of the cost of heading; no tipping of rolls on end.

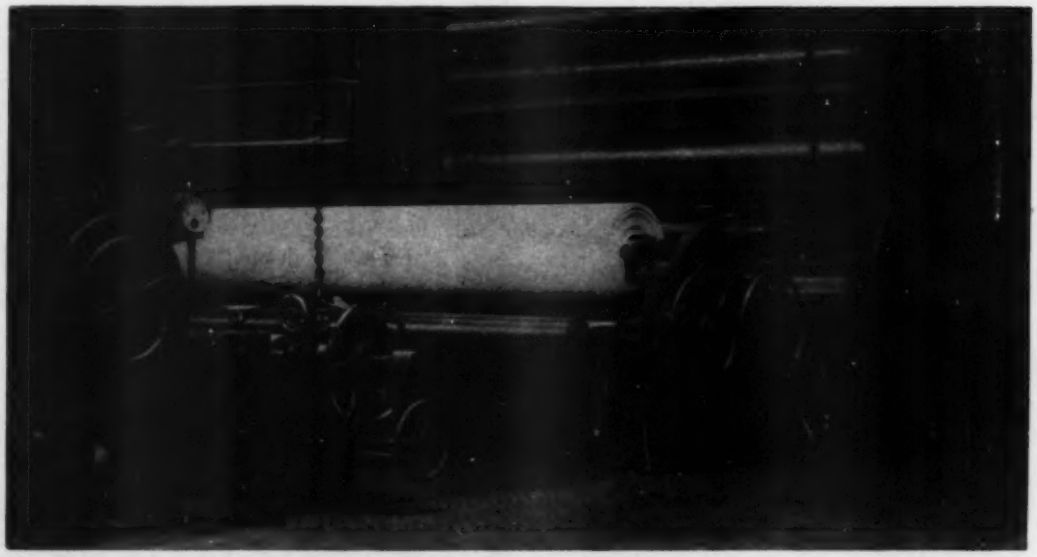
It makes neater rolls and gives your customers a better impression at first sight.

The Murray Heading Machine can be supplied for use as:

(1) a plain heading machine only.
(2) a heading machine mounted directly on a scale as a unit. (See illustration above).
(3) a plain heading machine mounted on a scale—all on a transfer car, to service more than one paper machine (as desired by some).
(4) a heading machine only on car, or
(5) any conceivable combination of units, to suit almost any range of diameters and lengths.

D·J·MURRAY MANUFACTURING COMPANY
WAUSAU WISCONSIN

DESIGNERS, ENGINEERS AND MANUFACTURERS OF PULP AND PAPER MILL MACHINERY



THE POPE REEL

THE **POPE REEL** AND **POPE AIR DEVICES** REDUCE TO A MINIMUM LOSSES IN HANDLING PAPER ON THE MACHINE.

POPE APPLIANCE CORPORATION

ELLIOTT F. ALDRICH, AGENT, 45 MILK STREET, BOSTON, MASS.

sales manager of the Bedford Pulp and Paper Corporation, is now connected in the capacity of salesman with the Bayless Pulp and Paper Corp., manufacturer of high grades of Mitscherlich water finish and dry finish papers, as well as the famous brand of Water Finish Red Cap. Mr. Denton will travel for the Bayless organization in the southern states and the central West, where he is well acquainted with the trade, making his headquarters in Atlanta, Ga.

J. O. Short, purchasing agent of the Flintkote Company, Inc., roofing paper manufacturers of Little Ferry, N. J., has been transferred to the Boston office of the company, and henceforth A. R. Campbell, who has been Mr. Short's assistant in the purchasing department, will have charge of purchases of raw materials for the Flintkote mill in Little Ferry.

The New York offices of E. Butterworth & Company, Inc., dealers in and importers of papermakers, supplies, have been removed to 1123 Broadway, where the new telephone number is Watkins 9-2023. B. D. Wheeler is in charge of the New York office of the company, which has offices also in Boston, Mass., and in England.

The report of the United Paperboard Company, Inc., with headquarters in New York City, shows a loss of $92,485 before depreciation for the six months ended November 29 last, compared with a net profit of $253,172 before taxes and depreciation for the corresponding period of 1929. Gross sales were $2,632,359, against $4,422,645 in the prior period.

Harry C. Campbell, formerly general sales manager of the Robert Gair Company, of New York, has joined the Morris Paper Mills, Inc., in Chicago, according to announcement issued here.

Peter Mott, retired superintendent of the Gould Paper Mills in Lyons Falls, N. Y., died suddenly on January 31 at the home of his daughter, Mrs. Elmer Jacobus, at 68 Park avenue in Bloomfield, N. J., from a heart attack. He was born in Alsace-Lorraine 78 years ago. A son and two daughters survive.

◆ NORTHERN NEW YORK ◆

Sale of Warren Parchment Rumored

Negotiations were started late in February for the purchase of the property of the Warren Parchment Co. at Dexter. The name of the prospective purchaser has not been divulged. John J. Warren, Brownville, said on February 27 that there was no information he could give at the time as the transaction had not progressed to a definite point. An inspection of the mill and equipment has been made by the prospective purchasers.

The plant is a small one devoted to the manufacture of greaseproof paper, but has not been in operation for more than a year. After closing the mill the company went into receivership and settlement was made with the creditors by Mr. Warren, the controlling stockholder at 25 cents on the dollar. Mr. Warren then took over the exclusive ownership, but the mill has never been reopened. During its operation it had a weekly pay-roll of about $750.

The Defiance Paper Co. of Niagara Falls has announced the sale of its glazed paper business to the Fox Paper Co. of Lockland, O. Operations of the business will be transferred to Lockland.

Alexander Copley, pioneer in the lumber business in northern New York, died at his home in Antwerp on Monday, March 2. Mr. Copley was at one time one of the largest owners of timber lands in the northern section of New York

St. Regis Paper Company

Daily Capacity, 525 Tons

Newsprint

Catalog and Directory

Packers Oiled Manila

Fibre Wrapping

R. R. Writing—Poster and

Construction Papers

Cover and

Other Specialties

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Telephone, Randolph 0534

Over Fifty Years

Experience in the manufacturing of wires for American and Foreign paper makers and the ever increasing use of Appleton Wires testify to their quality.

Looms of our own design, wire drawn in our own plant to specifications derived from exhaustive research, and carefully trained operators make this high quality possible.

Appleton Wires

are good wires

APPLETON WIRE WORKS INC., APPLETON, WIS.

state. He owned a tract of 8,000 acres near Antwerp which furnished a large amount of pulpwood to paper mills. The tract was sold to the Carthage Timber Corporation in 1920 and since that time Mr. Copley had lived in retired life.

New Company to Manufacture Pulp from Waste Paper

The Snow-white Co. Inc., has just been organized for the purpose of reclaiming waste paper by the new Snow-white Process.

The present offices of the company are at Oswego, N. Y. and they have an option on a large group of factory buildings located on the Barge canal, so it will be possible to bring their raw material in by water during the open navigation season, and also to ship the finished product the same way, thus affording a vast saving in freight charges.

W. Jay Russell, a new man in the paper field, is president. Associated with him is Mr. Wm. J. Dial, of Dayton, Ohio, who has had twenty-eight years experience in the manufacture of paper and reclaimed pulp, having for eight years been with Crocker, Burbank & Co., at Fitchburg, Mass., for several years with the Champion Coated Paper Co., of Hamilton, Ohio, and more recently with the Oxford Miami Paper Co., at West Carrollton.

Mr. John A. Wiener one of the best known construction and paper mill men in the United States will act as consultant in layout and construction, and Graham Prather of Oswego will be the engineer in active charge.

Prof. C. E. Libby, of Syracuse, has already made numerous tests and studies in connection with the process and the cost of reclaiming by present day methods.

The initial layout calls for a plant capable of turning out from 30 to 50 tons of pulp a day, which by the addition of machines can be increased to 100 tons in 24 hours.

As soon as the equipment is placed, commercial samples will be produced first and the production increased to take care of the orders. At first the pulp will be shipped about 50 per cent dry, as the reduced cost of re-pulping will offset the additional freight. While most paper mill men admit that a better paper can be made by the use of some reclaimed pulp, the Snow-white Co. Inc., will be one of the first, we believe, to produce reclaimed market pulp.

Papers merging the Sulham Manufacturing Company, Inc., of Malone, with the St. Regis Falls Wood Corporation were filed with the department of state at Albany, February 28.

Logging operations of the Gould Paper Co. of Lyons Falls at its North Lake tract were concluded late in February. The season was ideal with respect to weather conditions and 30,000 cords of pulpwood is now on the skidways awaiting the spring freshets to take it down the Moose river to the mills at Lyons Falls. Between 200 and 250 men were employed in the woods.

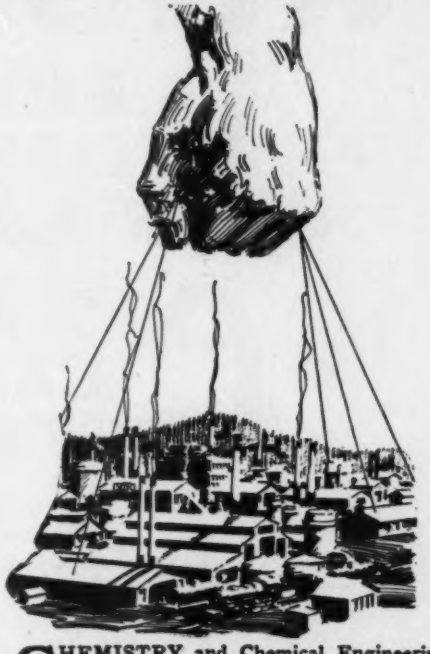
The Robert Gair Company is installing a new 700 hp. high pressure boiler at its Tonawanda, N. Y. plant, which will involve the expenditure of $75,000, and is the first step in a boiler program planned to completely modernize the power plant of the Tonawanda division.

Alfred Clement Coty and Thomas Earl Coty of Watertown have been issued a patent by the United States patent office covering their machine for making paper bags. The invention comprises mechanisms for closing the ends of tubular blanks which are turned out of the machine as bags. Application was filed for the patent August 30, 1929. Nine patentable features were recognized.

George Pomeroy of Irving, Mass., assumed his duties as assistant superintendent of the Harrisville Paper Co. at Harrisville on March 1. Thomas Legge is the superintendent of the mill, a subsidiary of the St. Regis Paper Co. Mr.

CHEMICAL SCIENCE

- - - raises the paper industry to higher levels



CHEMISTRY and Chemical Engineering are keeping many a paper and pulp mill out of the red, can do the same for many others, will do it for all who know how to utilize these great forces.

Every man responsible for methods, materials, machinery, processing efficiency, product quality and sales promotion in any branch of the paper and pulp industry, owes it to himself, his profession, his employers and his Country to maintain that leadership necessary to prosperity via Chemistry and the allied sciences.

Ready to the hand of those for whom chemical science can do so much is this year's Exposition of Chemical Industries.

Viewed as a whole it will be a striking demonstration of Industry transformed by Science.

Viewed in detail, it is a post-graduate course without which previous education is hopelessly handicapped in dealing with the needs of the day.

Available at this great national institution of learning will be opportunities to discuss your interests with hundreds of specialists in attendance to serve you.

Exhibits—visual, tangible, comparable embodiments of progress include processing equipment, instruments of precision, chemicals, chemical products, laboratory supplies and a wide variety of technical products used in pulp and paper making.

Attending this Exposition yourself is not enough. Bring from your organization those who have operating responsibilities requiring knowledge of modern methods, machines, materials. And bring those whose "sayso" counts when newer, better equipment is needed. They'll be glad they came. So will you.

13th Exposition CHEMICAL INDUSTRIES

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1864 1931

KNOX WOOLEN COMPANY

"EXCELSIOR"

FELTS & JACKETS

CAMDEN, MAINE

Excelled by none
X-tra quality
Chosen by leading paper makers
Experience of 67 years
Leading in uniformity of product
Special Felts to meet every condition
Information on felt problems freely given
Originated in 1864
Reduce your felt costs by using

"Excelsior" Felts & Jackets

Manufactured and sold by

KNOX WOOLEN COMPANY

Camden, Maine

also by

BULKLEY, DUNTON & COMPANY, Agents

75 Duane St., New York City

Pomeroy has been superintendent of the Irving Paper Co. at Irving, Mass., for sometime and is an expert in the manufacture of specialty grades such as are made at the Harrisville mill, including bleached sulphite bond and cover.

The Racquette River Paper Co. of Potsdam has been and is now operating on a fairly steady schedule, it was recently said at the company offices. The number on the pay-roll as of February 1 is 341. The Potsdam plant has been kept fairly up to standard production, due largely to development of new papers which have found a ready market.

General Ira L. Beebe

Ira L. Beebe, for years a prominent figure in the pulp and paper trade, died on Thursday, February 19, 1931, at his daughter's home in Jamestown, N. Y., in the ninetieth year of his age.

The late General Beebe was probably the oldest member of the New York paper trade. He was born in Ghent, New York, February 25, 1841. His father, Roderick Beebe, was a pioneer in the paper trade, when Ira was a boy.

General Beebe was the founder of Ira L. Beebe & Co., a firm which in the 70's controlled the output of newsprint made at Watertown, N. Y. He, with Senator Warner Miller, was the first to introduce groundwood pulp into the manufacture of newsprint, and he was one of the largest importers of sulphite pulps from Europe. He was a man of quiet tastes, well liked and admired by a host of friends.

Ira L. Beebe was brevetted Brigadier General when in command of the Eleventh Brigade of the National Guard in Brooklyn. He served during the Civil war with Company E, of the 7th Regiment.

Besides his two daughters, Mrs. Cyrus E. Jones and Mrs. Spring, he leaves two brothers, Charles and Clarence Beebe, who are still active in the paper trade.

Charles D. Bingham Retires

Charles D. Bingham of Watertown, who has been associated with the management of Bagley & Sewall Co. for more than 43 years, the last 33 of these years as treasurer and director, retired from these positions the early part of February. Carroll L. Thompson, formerly secretary and assistant treasurer, succeeds Mr. Bingham as treasurer while Virgil K. Kellogg was elected to fill the vacancy on the board of directors caused by Mr. Bingham's withdrawal from that body, Harry C. Kinne, assistant sales manager, was elected secretary.

It is understood that Mr .Bingham, who is nearly 85, will continue to be connected with the company in an advisory capacity. The stockholders adopted a resolution at the annual meeting expressing regret at Mr. Bingham's retirement and voicing appreciation of the many years of able service that he had rendered the company.

Morse Chain Salesmen Convene

The Morse Chain Company, Ithaca, N. Y., manufacturers of Morse silent chain drives, flexible couplings, and chain speed reducers, have just completed the most enthusiastic sales convention in the history of the company, according to Mr. F. C. Thompson, vice-president and general manager. Salesmen from the entire country were called in to spend three days at the main plant at Ithaca, leaving there by special car for a one day session at Detroit, where the new marine specialties recently developed were presented to them.

Officials of the Borg-Warner Corporation, of which the Morse Chain Company is a subsidiary, were in attendance at a banquet which marked the close of the convention.

Knowlton Brothers, Inc., which operated for some weeks on a part-time basis, now has its employees working six full days a week. Though hampered by low water conditions in the Black river, the Watertown paper manufacturing plant is operating full time with the aid of outside electrical

STAINLESS STEEL VALVES

We are building a complete line of Globe, Angle, and Y Valves in Stainless Steel designed especially for relief and acid line service in sulphite mills.

Important features are exclusive patterns for chrome nickel castings—extra heavy bodies with uniform cross sections—flanged bonnets with outside screw and yoke—all parts *renewable* and *interchangeable* in all three types of the same size.

Constructed throughout of a chrome nickel alloy which has proven its resistance to sulphite liquor and gas, our valves will lower maintenance costs decidedly.

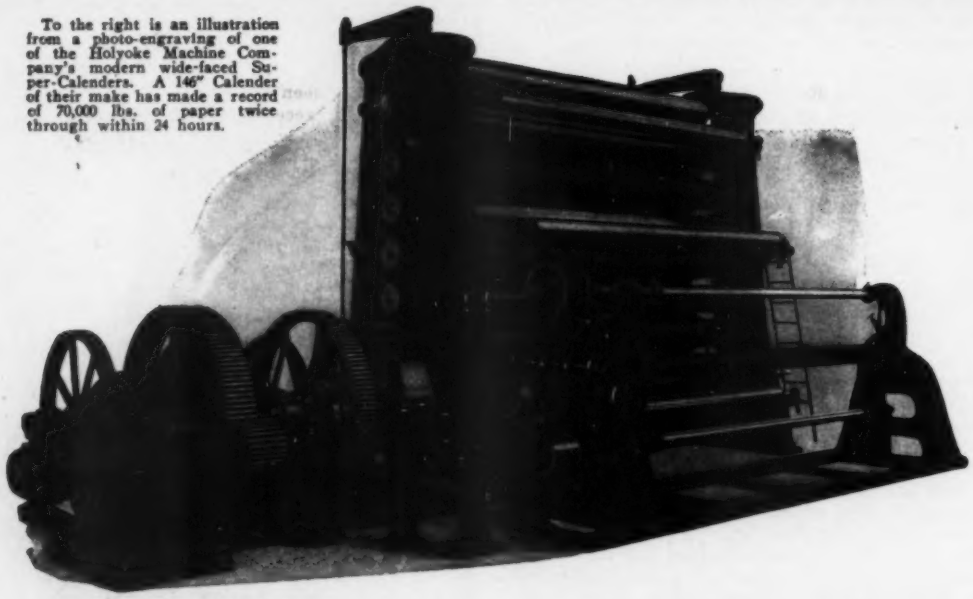
Write for our new descriptive bulletin and prices.

ALLOY STEEL PRODUCTS COMPANY

Subsidiary of Sturtevant Mill Co.

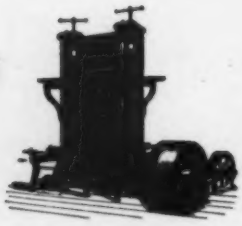
103 Clayton Street Boston, Mass.

To the right is an illustration from a photo-engraving of one of the Holyoke Machine Company's modern wide-faced Super-Calenders. A 146" Calender of their make has made a record of 70,000 lbs. of paper twice through within 24 hours.



BUILT-TO-ORDER

By HOLYOKE



Since 1863

The print above is from a larger original wood cut of a HOLYOKE 36" Web Calender installed over fifty years ago. Constant improvements in stride with the times, plus high and unwavering standard of high quality, account for the LEADERSHIP of HOLYOKE.

Superior Engineering Skill is part of the design and construction of every HOLYOKE machine. So much so, that while different installations may resemble one another in type, yet each machine is "Built-to-Order" in a very real sense. Special details, changes, and improvements are carefully included to meet the exact requirements of local conditions. When planning on new equipment or replacements write HOLYOKE Engineers, HOLYOKE Machine Co., HOLYOKE, Mass.

Manufacturers of Super-Calenders, Platers, Cotton and Paper Rolls, Washing and Beating Engines, Wood Pulp Grinders, Barkers, Chippers, Rag and Paper Dusters, Rag Cutters, Hydraulic Pumps and Presses, Hercules Water Wheels and Governors.

The HOLYOKE MACHINE COMPANY

FOUNDED 1863

power. It is stated that business prospects for the mill are beginning to look brighter.

Lester A. Dorn, president of Lester A. Dorn & Son, paper box manufacturers of Jamestown, died at his home in Jamestown February 13. Mr. Dorn had served several terms as chairman of the National Paper Box Manufacturers' Association.

The New York and Pennsylvania Pulp & Paper Co. plant at Willsboro resumed operations on March 2. A full force of 200 men and an extra night force was employed to fill depleted inventory. The plant is one of the largest in the Champlain valley. It has been closed since last fall.

❖ NEW ENGLAND ❖

Henry M. Wheelwright

Henry M. Wheelwright, vice-president and director of George W. Wheelwright Paper Co., North Leominster, Mass., passed away February 23 after a brief illness.

Mr. Wheelwright was born in Boston 60 years ago. He graduated from Harvard and became a serious student of papermaking. He first worked as a mill hand at the Wheelwright mill in Hardwick and occupied various positions until 1896 when he became agent for the mill. Two years later he studied papermaking in England for several months, returning home to resume his position with the paper company.

He is survived by his wife, two sons and a daughter.

Tariff Items

The pulp rate situation at Portland seems to be proving a menace to business of the port as a whole. This has brought strong pressure to bear from many sources on the Maine Central R. R. to alter its arbitrary policy, looking toward an enforced diversion of the heavy wood pulp movement through that port to the piers of the Portland Terminal Co. (Maine Central subsidiary) from those of the Grand Trunk.

The Maine Central refuses future participation in a former joint arrangement which permitted switching from either pier at the nominal charge, although a large part of the Portland imports are destined for middle western mills.

The city of Portland has suddenly appreciated the gravity of the situation resulting in a port by Henry F. Merrill, chairman, port of Portland authority, that 38 steamers chartered and either loading or shortly to load from Baltic ports to Portland with 100,000 tons of pulp, have been diverted to other Atlantic ports, principally Baltimore.

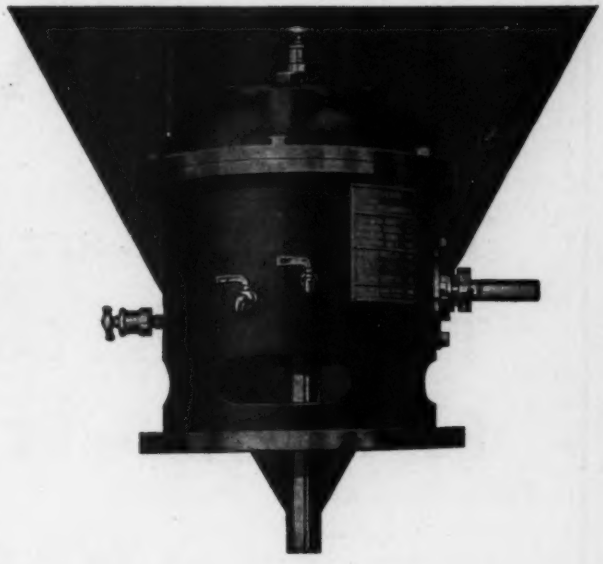
No more arbitrary action on the part of a carrier could be imagined, particularly where the welfare of mills on their lines and the chief city served is at stake. A hearing at Boston, already reported in these columns was without avail and a suspension proceeding is entered with the I. C. C.

Following I. C. C. orders, the Boston & Maine R. R. has established new rates of 27¢ over direct routing from Berlin N. H., to Pencoyd (McDowell Paper Mills) Pa., and 22.5¢ per 100 pounds from Mt. Tom, Mass., to the same consuming points.

In pursuing its argument for lower import and export rates to offset the higher cost of handling freight at New York, comparisons were made to show the undue share of New England produced goods, exported through New York. Among these were paper of which Boston shipped but $800,000 worth of her nearby products, while New York handled over $2,800,000 in one year.

Abandonment by the intercoastal steamship lines of the conference method of adjusting freight rates has started a condition described by some as a rate war, in which paper is one of the most desirable commodities sought by the competing lines. New England paper companies previously paying rates of 55¢ per 100 pounds to the coast, have recently received tariffs of 48¢ on printing and wrapping paper, and one line made a tentative rate by mail to various shippers of

NEW ENGLAND AGITATOR DRIVES



the new T-17

MODERN -- in every detail -- incorporating in its design the proven features of highest efficiency. Fully enclosed - Conseratively rated -- The new T-17 finds wide usage for many types of work. Send for special bulletin.

NEW ENGLAND TANK & TOWER CO.

EVERETT, MASS. - 50 CHURCH ST., NEW YORK

An Established FACT

TENAX Felts are the Best Felts Made

They Meet All Conditions

For All Grades of Paper

NON-USERS ARE THE LOSERS

Manufactured Only By

LOCKPORT FELT COMPANY

NEWFANE, N. Y.

45¢, on printing papers only. The paper mills in New England have a very substantial west coast trade, and more than one merchant is interested both from an east-bound as well as a west-bound movement. They believe that 40¢ will be quoted before the dispute between the lines is settled.

Improvements which have been underway for sometime at the mill offices of Hollingsworth & Whitney Co., Gardiner, Me., have been completed and the mill staff is now occupying them after sometime in temporary quarters. The company is thus coming to the end of its million dollar improvement and expansion program carried out largely during 1930.

Energetic New England protest against any oil embargo or import restriction will continue unabated in this and all subsequent Congresses. Stoppage of heavy oil imports used by tidewater mills for steam power production will drive mills back to coal. It will not benefit American oil producers because the grade bought in tanker lots from South America is not available at low prices from American producing areas where too large a crude percentage goes into higher refining processes. This is the view of the Associated Industries of Massachusetts including in its numbers some oil burning paper mills, and is most vociferously the view of Maine where oil burning has increased lately. Most mills using oil can shift to coal in 24 hours or less. The Maine Seaboard Paper Co., Bucksport, Me., buying oil in 65,000 barrel tanker lots, is a case in point.

Massachusetts Department of Labor and Industries reporting employment conditions in leading industries of the State, surveyed among others, 27 paper and pulp mills, finding, out of a normal 6,455 persons required to run these mills there are 5,587 at work in January, down about 100 from December, and of these but 1,888 are on full time.

The Bangor Hydroelectric Company has acquired from the Eastern Manufacturing Co., of South Brewer, the latter's power station on the Stillwater Branch of the Penobscot river with transmission lines from these stations to the Eastern plant at Basin Mills. E. M. Graham, president of the Bangor company, also announces construction of an interchange high voltage line between Veazie and Bucksport where the Central's subsidiary, Maine Seaboard Paper Co., is operating.

Eastern Manufacturing Company's 1930 operations resulted in a sharp decrease in profits to $249,551 after taxes, interest and depreciation from $929,517 in 1929. The 1930 showing included results of the Orono Pulp & Paper Company which was acquired January 1, 1930.

Minute Man Service on the Boston & Maine R. R. is a fast dependable freight service offered shippers at no extra cost and speeding up freight movement from the western gateways at Mechanicville or Rotterdam Junction to Boston so that elapsed time between the two extreme ends of the system has been reduced to 36 hours. Incidentally, this carrier as well as the New Haven and Boston & Albany R. R., have delivered bituminous in less than four days from Pennsylvania to New England paper mills.

Warren Box & Printing Co., Boston, has been incorporated to manufacture and distribute paper boxes. Their capitalization is $30,000. James F. Faley of Boston is president, Benjamin F. Beebee of Medford is treasurer.

Success of Paper Flower Pot

The ingenious research engineers at Bird & Son Inc., have provided another piece of news with their new Neponset black flower pot, which according to Massachusetts Agricultural College tests has been proved actually superior to clay pots. The new flower pot has a waterproof paper base.

RYERSON

IMMEDIATE STEEL FOR MAINTENANCE AND REPAIR

When something breaks . . . and steel is needed in a hurry . . . you can depend upon Ryerson for quick action. Complete stocks of all steel products, including:

Bars	Wire	Babbitt Metal
Shapes	Chain	Tool Steel
Structurals	Turnbuckles	Bar Iron
Rails	Shafting	Refined Iron
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Sheets	Boiler Fittings	Safety Treads
Rivets	Corrugated Sheets	Small Tools
Bolts	Concrete Reinforcing	Machinery
Nails	Welding Rods	

Write for the Journal and Stock List — the "key" to Immediate Steel.

JOSEPH T. RYERSON & SON INC.

Chicago Milwaukee St. Louis Cincinnati Detroit
Cleveland Buffalo Jersey City Philadelphia Boston

STEEL

Built by E. D. Jones & Sons Company, Pittsfield, Mass.

The Newnap Felt Conditioner

is used for the reconditioning of felts such as applied on the wet end of a board machine and on the wet presses and suction presses of a paper machine. It eliminates felt marks, breaks after washups, decreases steam required for drying, and increases life of dryer felt, production, and final moisture content; assisting materially in producing a better final product.

BULLETIN ON REQUEST

FIDALGO DRYING SYSTEMS, Inc.
122 East 42nd St., New York, N. Y.

Hardy S. Ferguson & Co.

Consulting Engineers

200 Fifth Avenue **New York City**

Hardy S. Ferguson ..... Member A.S.C.E., A.S.M.E., E.I.C.
Moses H. Teaze ..... Member A.S.M.E., E.I.C.
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Consultation, reports, valuations, and complete designs and engineering supervision for the construction and equipment of

Pulp and Paper Mills and Other Industrial Plants
Steam and Hydro-electric Power Plants
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RYTHER AND PRINGLE COMPANY CARTHAGE N.Y.

RYTHER LOG HAULS

Constructed to carry any length of logs.

The construction can be of timbers or structural steel. The machine parts are extra heavy and designed for maximum capacities. The standard design is flexible and can be combined to meet all river and ice conditions.

Canadian Ingersoll-Rand Co., Ltd.
10 Phillips Sq., Montreal, P. Q.

Over this inside and out has been placed a special coating which further waterproofs it and at the same time insures a smooth surface, facilitating easy removal of plants. Professor Linus H. Jones of the Agricultural college tested 100 different types of paper pots in comparison with the clay ones, the result being the Bird product.

It was discovered that porosity is not necessary for growth, in fact, waterproof coating can be used as an aid to growth. Comparisons between the two types in growing tomato plants proved conclusively their superiority at the end of two months. The sales appeal is expected to be to market gardeners.

Alvah Crocker

Alvah Crocker, president and treasurer of Crocker, Burbank & Co. Association, died suddenly on Wednesday, February 25, 1931, at Mountain Lake, Fla., in the 72nd year of his age, and the funeral was held at Christ Church, Fitchburg, Mass., on Monday, March 2.

Mr. Crocker was playing golf on a course adjacent to his estate in Florida when he was stricken. He had left Fitchburg in his usual good health on January 16 for his annual stay in the South.

He was born in Fitchburg, August 28, 1858, the son of Charles T. and Helen (Tufts) Crocker. He was named for his grandfather, Col. Alvah Crocker, for many years Fitchburg's most prominent and enterprising citizen, the projector of the Hoosac Tunnel, and its most strenuous advocate through many years of opposition, over which he ultimately triumphed.

Alvah Crocker was graduated from Harvard University in 1879 and entered the paper company the same year, becoming assistant to the treasurer. The company was incorporated in 1909 as the Crocker and Burbank Company. In 1911 he became president and treasurer and continued in both offices after the co.. ern became Crocker, Burbank & Co., Association in 1918.

Mr. Crocker's business interests were not confined to the paper industry, though he did much to develop the plant at Fitchburg during his regime, including a change-over of water to electric power, construction of Mills 5 and 8 and additions to Mills 1, 6 and 7. The steam plant was also constructed, providing power and heat for the plant and steam for the dryers.

He is survived by his wife, Mrs. Charlotte (Bartow) Crocker; two sons, Douglas, who assisted his father in the management of the mill, and the Rev. John Crocker, of Princeton, N. J.; two daughters, Mrs. Willard Soper, of New Haven, Conn., and Mrs. Shaun Kelley, of Richmond.

E. A. Rusden

Ethelbert A. Rusden, president and general manager of the Textile-Finishing Machinery Company, Providence, R. I., passed away recently in Baltimore, at the age of 72.

Mr. Rusden was born in Manchester, Eng., and came to this country as the representative of Mather & Pratt, machine manufacturers, in 1887. A few years later, he became associated with the Lincoln Machine Company of Hartford, and still later became a member of the firm of Lawrie, Buchanan & Rusden, of New York, makers of dyestuffs and chemicals.

In 1899, he established the Rusden Machine Company of Warren, and in 1902 formed a consolidation under the name of the Textile-Finishing Machinery Company of Providence, combining with the Granger Foundry Machine Company, Thomas Phillips Company and the Phenix Iron Works, all of Providence. Mr. Rusden served as president and general manager of the firm for years.

He is survived by his widow, a son and a brother.

At Framingham, Mass., the Dennison Manufacturing Co., leading manufacturers of lace paper goods, tags and napkins, fancy papers, etc., have announced another policy for the current depression period aimed to provide the maximum employment. It is to be a 44 hour week put into effect on February 25. Thomas G. Portmore, works manager, in an-

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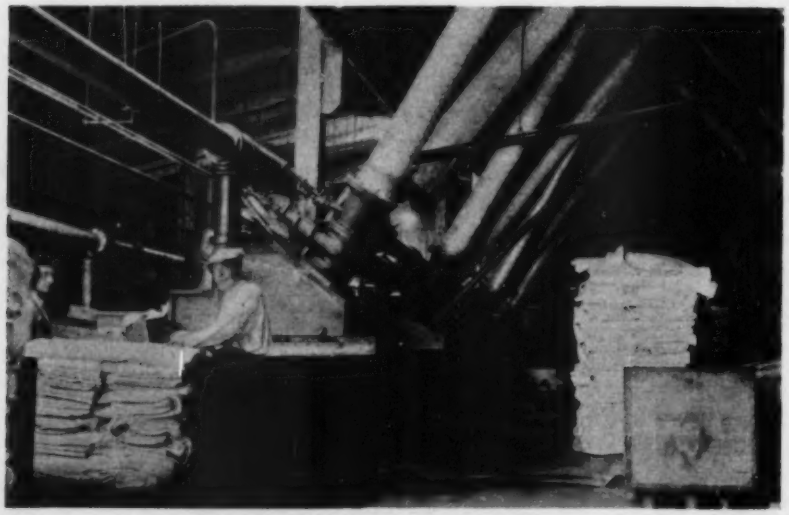

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nouncing the plan states that it has been adopted in order to spread out work among all employees, so that it will not be necessary to enforce any layoffs. For the period of the emergency the working day will close at 4:45 each afternoon, and at 11:45 a. m. Saturdays.

Bird Personnel Changes

Stephen W. Smith for some years in charge of manufacturing in the paper and box plants of Bird & Son Inc., at East Walpole, Mass., has resigned to become associated with the Brown Co., of Berlin, N. H., in the latter's paper division and in a consulting capacity. He is succeeded by Charles W. Conrad, who has been with the organization since 1920. He now becomes general superintendent in charge of all manufacturing at the East Walpole mills. He has had charge of various new construction jobs at the plant including the new laboratory, the high pressure steam line from East Walpole to Norwood, a wonder of modern power plant engineering and has also supervised increases to the power plants.

S. B. Montgomery, assistant manufacturing manager, has retired from Bird & Son to resume the practice of law with Powers & Hall, Boston, and his place is taken by Ralph A. Wilkins who becomes paper mill superintendent. Other Bird changes include the appointment of William S. Jackson as manufacturing staff engineer, coming from the Bird Chicago division, while William S. Jackson becomes superintendent of No. 2 box shop, succeeding S. W. Gladding who has become associated with the S.R.C. Box Co., of Palmer, Mass.

The Rogers Paper Manufacturing Company of South Manchester, Conn. manufacturer of mechanically constructed insulating paper, announces a new and complete line of quality products under the trade names of: Duro, Rayco, Royalgrey and Rajahgrey—and will continue to supply their well-known Armco Insulating Paper.

❖ OHIO ❖

Mead Corporation Buys Airplane

The February issue of **Mead Co-Operation** contains an interesting article announcing the acquisition of a six-passenger Bellanca airplane by The Mead Corporation, in company with The Mead Sales Co., the G. H. Mead Co. and the N. S. Talbott Co., of Dayton, Ohio. The plane will be used jointly by the executives of these organizations whenever it is deemed advisable.

The need for rapid transportation has concerned The Mead Corporation for sometime past because of the fact that the companies various units are scattered over a wide area, several of them being located in communities that are hard to contact without great loss of time.

Howard Rhinehart of Dayton, has been engaged as pilot.

Hermann Develops New Jordan Filling

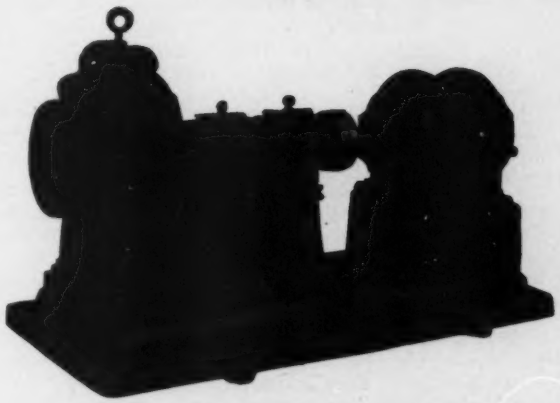
The Hermann Manufacturing Company of Lancaster, Ohio, has recently developed a new assembled jordan shell filling in which both the wooden wedge and anchor bar are supplanted by a bronze device that automatically tightens and at the same time locks the filling to the jordan shell.

It is claimed that this filling has several desirable advantages that are lacking in other assembled fillings of similar types.

Ease and rapidity of installation, and ability to remove for chipping, are two features that effect a big saving in time and labor.

Another very desirable feature is the fact that the knives and wood spacers in the tightening process, slip on the retaining rings with the result that the pressure is applied equally to each individual knife and wood throughout the entire circumference of the filling. Patents have been applied for.

The Watchword *is Economy!*



...and FREDERICK STOCK PUMPS do take less Power!

The value of any piece of mechanical equipment is in direct proportion to the service it renders, and the length of time it *stays* in service.

Economy is closely connected with value—indeed, the watchword today is Economy . . . In a stock pump, for instance, continuous service is a first requisite if costly shutdowns are to be avoided; but since the cost of power in paper and pulp mills is one of the largest items of overhead, any pump that *takes less power* has an equally strong claim to value.

Frederick pumps do both: They take less power, and they give continuous service. That is why the list of paper and pulp mills reads like a blue book of the Industry! WRITE FOR OUR LATEST PAPER MILL FOLDER.

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WANTED—First class night superintendent for Glassine Mill. Must have thorough knowledge of beating, paper machines, and calenders. Can also place calender runners and rewinder men. Address Box 188, The Paper Industry.

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A Research Laboratory in eastern Massachusetts has immediate opening for man qualified by practical experience to operate semi-commercial pulp and paper making equipment on a wide range of products and assist in preparation of engineering reports on technical and economic aspects of such work. Applicant must have good personality and initiative. References as to character and ability, as well as statement of training, experience and salary requirements, and preferably a recent photograph, should accompany the application. Address Box 191, The Paper Industry.

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Announcing the Publication and Free Distribution of "POSSIBILITIES OF PULP AND PAPER MAKING IN FLORIDA"

By
Harry Lee Baker and William L. Wilson

The bulletin presents information of interest to pulp company executives on the following subjects:

(1) The fast growing Slash and Longleaf pines,
(2) Suitability of Southern pines for pulp making,
(3) Pulpwood resources of the South and in Florida,
(4) A perpetual supply of raw materials under simple forest management, and
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SOUTHERN

New Mississippi Forestry Ass'n

With promotion of forestry in Mississippi as its objective, the Mississippi State Forestry association came into existence February 12 under the sponsorship of the State Forest Service. Frank Wisner, Laurel Lumberman, was selected president of the organization; Earl T. Taylor, Gulfport, secretary, and Wiley P. Harris, Jackson, treasurer. Dr. Charles Herty, nationally known chemist, addressed the organization meeting which was attended by approximately 100 forest-interested persons.

W. C. McCormick, Florida, regional director of the American Forestry association, addressed the gathering on the joint educational campaign conducted in Mississippi by his organization and that state forest service. Mr. McCormick said that every county in the state had been visited by representatives of his association in the campaign, and that considerable interest in forestry had been aroused through this medium. The executive committee of the new organization is composed of the following, in addition to the officers: B. R. Nichols, Forest; Will Dockery, Dockery; F. A. Anderson, Floster; H. W. Gautier, Pascagoula; J. M. Aldrich, Michigan City; Mrs. G. H. Revees, Jackson, and Mrs. O. B. Taylor, Jackson.

R. H. Laftman, former general manager of the Bogalusa Paper Company, who with his family left February 28 for New York, from which point they will sail for a visit with relatives and friends in Sweden and other European countries, was given a surprise when he was called to the office of the Bogalusa Paper Company, and presented with a silver coffee and tea set. The presentation was made to Mr. Laftman by R. H. Stevens on behalf of all the mill employees.

Harlin E. Olmstead

Harlin E. Olmstead, 34 years old, of New York, feel dead near the Del Monte polo field, in California, February 10. He was the son of Mrs. Vance McCormick of Harrisburg, Pa. His stepfather was Vance Griswell McCormick, newspaper publisher and a prominent figure in Pennsylvania and national Democratic politics.

Mr. Olmstead was assistant general manager of the Great Southern Lumber Company Bogalusa, La., prior to the death of Colonel W. H. Sullivan and was widely known in that section. When the Goodyear interests acquired timber tracts in California and purchased the Redwood Steamship Line, principally for their own operations between Pacific and Gulf ports, Mr. Olmstead was placed in charge of the steamship line. Later he was called to New York by Colonel A. C. Goodyear to become assistant to the president of the National Kraft Paper Manufacturers' Association. Mr. Olmstead was a native of Scranton, Pa. His father, H. E. Olmstead, who died many years ago, was attorney for the Goodyear interests when they first entered the lumber industry and founded the city of Bogalusa.

A species of poplar tree which makes a valuable pulpwood is being grown at the Palm Lodge botanical garden of H. W. Johnson, near Homestead. The tree grows on waste land and even when in contact with salt-water matures so rapidly that it is claimed a crop of pulpwood may be cut every year. The experiment is made with a view to planting pulp stands on Florida waste lands.

International Sued for Breach of Contract

Breach of contract which provided for delivery of 20,000 cords of wood per year for a period of three years was alleged in a suit for $35,000 filed in circuit court by W. E. Williams against the International Paper Company of Alabama. The suit was filed by Attorneys Harry T. Smith and Caffey.

Williams claims that he entered into a contract with the

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paper mill on January 29, 1929, for delivery of 20,000 cords of wood yearly for a period of three years to the yards of the concern at Sibert Station, where the plant is located, and that he was to be paid at the rate of $5.50 per cord. Deliveries were made under terms of the contract, his petition claims, until January 21, 1930. At that time, the petition recites, the company broke the contract and "repudiated" the agreement.

National Paper Box Mfrs. Meet

That the paper container is no longer just a container, but a work of art, was brought out by Howard O. Beckett, commissioner of the National Paper Box Manufacturer's association, in a talk before the Southern division of this organization.

Mr. Beckett's talk opened the closing session of a two-day conference that was held in New Orleans, by about 30 representatives of a number of paper box manufacturers of the South. Mr. Beckett is from Philadelphia and attends all division meetings of the organization as a representative of the national body. Mr. Beckett also told the delegates that there is unquestionably a decided change in sentiment in the past few weeks in all sections of the country where he has been as to business in general. This, he said, may not be necessarily construed as optimism but it certainly means that there is less pessimism than there formerly was.

The case of the International Paper Company, Mobile, charged with stream pollution has been re-set for hearing at a later date. The continuance was requested by the state to allow it time to ascertain the proper name of the defendant. The indictment against the paper company was returned last spring when hundreds of fish in Chickasabogue creek were killed, allegedly from poison discharged into the stream from the paper company's plant.

The Advance Bag and Paper Mill, located at Howland, Maine, will be moved to Hodge, La., if the people of Jackson parish vote a five-year tax exemption. The police jury, parish school board, local Lions clubs, and every section of the parish give assurance that the exemption will be voted overwhelmingly.

Wayne Davies, formerly with E. F. Houghton & Co. as manager of leather sales, is now connected with J. E. Rhoads & Sons, Philadelphia, as sales engineer. Mr. Davies has had a wide experience in transmission, conveying and hydraulic packing design and is well and favorably known in many of the industrial plants of the country.

The Truscon Steel Company, Youngstown, Ohio, announces the appointment of Clark P. Pond as vice-president in charge of engineering and sales. Mr. Pond has been connected in a similar capacity with the David Lupton's Sons Co., and is widely known in the building field.

The American Engineering Co., Philadelphia, has appointed Le Sauvage & Beardsley, Buffalo, N. Y., as its direct representative for Lo-Hed Monorail Electric Hoists in the districts of Buffalo and Rochester. Weed and Company will continue to distribute this product, co-operating with the new representative.

The Duriron Company, Inc., Dayton, Ohio, announces the opening of the following branch offices: Cleveland, Ohio, located in the Leaderer Bldg., Superior avenue and East Sixth street, in charge of E. D. Brauns; Detroit, Michigan, in the General Motors Bldg., West Grand Blvd., in charge of R. R. Rourke.

The Swedish Chamber of Commerce of the United States announces the removal of its offices to the Chrysler bldg., 405 Lexington Ave., New York City.

The Moore & White Co., Philadelphia, has received another order from the Scott Paper Co., Chester, Pa., for a 180-inch fourdrinier paper machine.

The American Writing Paper Co., Holyoke, Mass., has ordered from J. O. Ross Engineering Corp., New York City, a Ross-Vapor absorption system for its Gill Division.

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AMERICAN DELTHIRNA CORPORATION

Technical Developments in the Paper Industry

Domestic and Foreign

The following abstracts are of the latest developments found in the foreign press and the domestic and foreign patent offices. Photostats and translations of complete articles and patents can be obtained at cost price.

Alkali Free Cellulose

THE purpose of this process is the manufacture of alkali-free cellulose. The cellulose, which has been freed of its hemicellulose content in the usual manner by treatment with alkali lyes, is freed from its alkali content by being treated with a salt solution or similar acting liquid, so as to avoid the reformation of hemicellulose before the washing with water.

For example, 100 kilograms of ordinary pulp are stirred around with 15 times the quantity of sodium hydroxide lye of 18 per cent concentration, until a completely homogeneous mixture is formed. Then the main portion of the alkali liquor is removed with the aid of a centrifuge or the like. The soda cellulose, which is obtained in this manner, is then mixed with an approximately 15 per cent concentrated solution of common salt and allowed to remain there for two hours. The mixture of sodium chloride and sodium hydroxide solutions is then removed and the product is washed with water until the wash liquors have only a slight alkaline reaction. The remaining quantity of alkali which still adheres to the cellulose is neutralized with the aid of a ten per cent solution of hydrochloric acid and then the cellulose is washed again until the wash liquors no longer give a reaction for chlorine and finally the cellulose is dried in the usual manner. Wolff & Co. Austrian Patent No. 119,117.

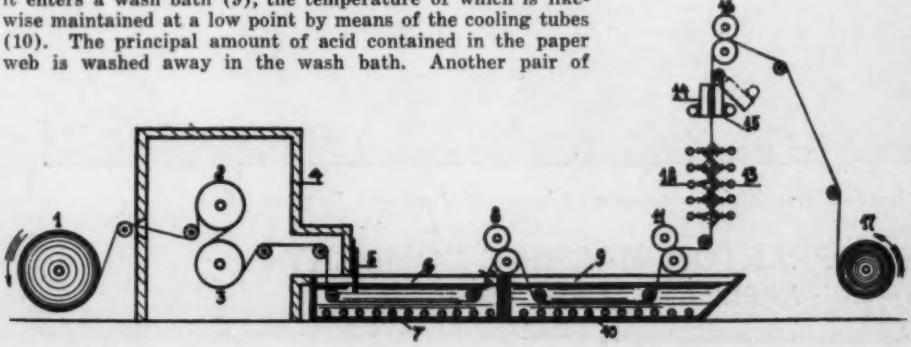
Parchmentizing Paper

THE figure shows an apparatus used in a new process for the manufacture of parchmentized paper. The paper passes through the machine and is unwound from the roll (1). The paper web first passes over the cooling cylinders (2) and (3). These cooling cylinders are advantageously arranged within a cooling chamber (4), into which the paper web runs through a narrow slit in the wall of the chamber. After the paper web has passed around these cylinders, it leaves the apparatus and enters the acid bath (6). The cooling chamber is shut off from this bath by means of a slide (5). The acid bath itself is cooled by means of the cooling tubes (7).

In this manner, the warm air of the room is kept away from the paper web and the cooling cylinders, so that these can exert a very effective cooling action and so that the paper web with a very low temperature, almost 32 deg. Fahr., can enter the acid bath in a colloidal-like condition.

The paper web is pulled through the acid bath and the cooling chamber by means of the squeeze rolls (8) and then it enters a wash bath (9), the temperature of which is likewise maintained at a low point by means of the cooling tubes (10). The principal amount of acid contained in the paper web is washed away in the wash bath. Another pair of squeeze rollers (11) serves to pull the paper web out of the wash bath.

The paper web then passes through a washing arrangement and a drying device. A series of atomizing nozzles, (12) (13), throw water in a very finely divided mist against the paper web. The drying is accomplished as the paper web passes between suction boxes (14) and (15). The suction device removes the last traces of water from the paper web. Linke-Hoffmann-Busch-Werke A. G., Warmbrunn, Schlesien. German Patent No. 502,129.



Chemical Change in Water and Effects on Rosin Sizing

THE author is concerned with an experimental study of the influence of the temperature on the chemical character of a water and its connection with the rosin sizing process and particularly with the use of sulphuric acid in the sizing process. The following tests were made:

In the first test, 500 cc. of water of 11 degrees hardness (German scale) were mixed with 100 cc. of rosin milk containing six grams of rosin per liter, of which 30 per cent is free rosin. After a few minutes a flocculent precipitate was formed which agglomerated and was easily filtered. The filtrate was slightly turbid. Aluminum sulphate was added to the filtrate and a finely flocculent precipitate was formed.

In the second test 500 cc. of the same water were mixed with an excess of dilute sulphuric acid until a strong acid action was obtained, before the 100 cc. of milk of rosin of the same concentration were added. A coarsely flocculent precipitate was immediately formed, which was very easily filtered. The filtrate was almost clear. When the latter was tested with aluminum sulphate, no precipitate was obtained.

In the third experiment 500 cc. of the same water were mixed with dilute sulphuric acid until a state of neutrality was reached, the indicator used being methyl orange. Then 100 cc. of the same concentration of milk of rosin were added. No precipitation took place and the solution remained in the form of a milky suspension after standing for days long. A portion of this solution was treated with aluminum sulphate, and a finely flocculent precipitate was immediately formed.

In the first two tests, the rosin was precipitated out of solution, first by the excess of alkaline earths present in the water and second by the excess acid. In the third test the sulphuric acid added made the lime salts harmless. These tests teach the practical man that in adding sulphuric acid to the water, before the latter is added to the beaters, only sufficient of the acid to neutralize the water must be added. Methyl orange should be used as an indicator in neutralizing the water. This corresponds to a degree of acidity in the contents of the beater of pH equal to 4.3 to 4.6. Dr. A. B. Halward, Tech. und Chemie der Papier und Zellstoff-Fabrikation, vol. 26, pages 165 to 168.

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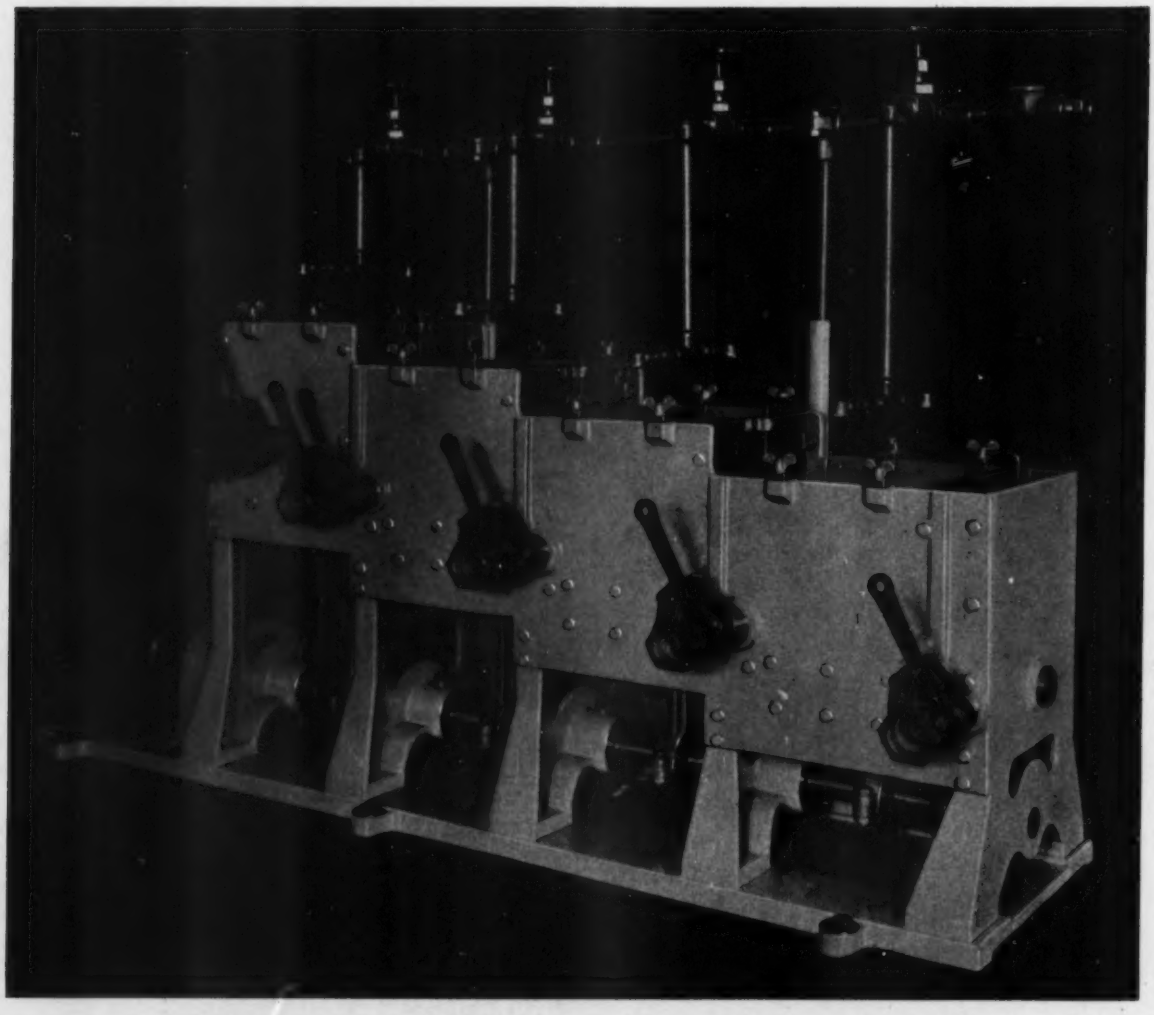

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■

Examining Half-Stuff and Paper with Mercury Arc Lamp

THIS article is concerned with experiments that were carried out in the Paper Testing Laboratory of the German Government at Berlin-Damlem. Various matters were investigated, including the changes in fluorescence with the action of the light, the changes in fluorescence caused by heat, the effect of moisture content of the test sample on the fluorescence and finally the changes in fluorescence produced by chemical influences. While the fluorescence is not much affected by slight changes in the dry content of the paper or half stuff, nevertheless a comparatively short action of light and heat as well as small chemical influences bring about considerable changes in the fluorescence.

In using the quartz-mercury lamp for the examination of half stuffs and paper, attention must be paid to the fact that the fluorescence of these substances is considerably changed by light, heat and chemical action. Inasmuch as it is not known in most cases whether or not these substances have been subjected to such influences, the tests made with the lamp are useful mostly as a criterion on which to base a comparison of the products and conclusions cannot be drawn.

The comparative or standard samples must be kept protected from external influences. Furthermore, due to the fact that the fluorescence of the product is also affected by the testing operation itself, it is necessary to use a fresh standard sample in making each examination. The ultra-violet lamp can be used with good results to determine the nature of the half stuff that is being tested. Thus, for example, it can be told from the examination whether or not the half-stuff is made from sulphate or sulphite pulp, whether or not it contains a light unbleached stock or a half-bleached stock, etc. It is also possible to determine by this test the degree of beating to which the stock has been subjected. Inasmuch as the action of the light is limited only to the surface of the sample, it is recommended in examining half-stuff under the ultra violet lamp to tear the sample open so that the interior of the same also comes under the influence of the ultra-violet rays. The article contains a short bibliography. H. G. Klein. Wochenblatt fuer Papierfabrikation, volume 61, pages 1248-1252.

Factors Affecting the Strength of Mechanical Wood

A SYSTEMATIC study has been made of the various factors that control the mechanical strength of mechanical wood pulp. These factors are grouped into two main classes, namely those that pertain to the original wood, such as the nature of the wood, the conditions of growth, the age, the

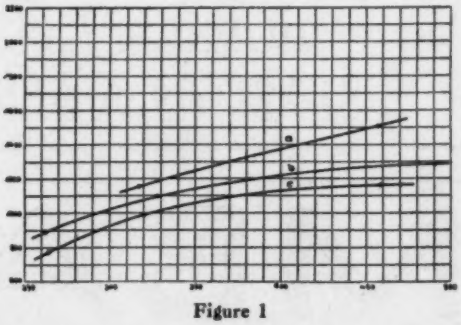

Figure 1

dryness of the wood (storage conditions) and the state of preservation of the wood, and those that pertain to the manufacturing operations, such as debarking, grinding, sorting, refining. Each factor is considered separately.

It is found for example that the greatest mechanical strength is found in pulp made from fresh wood and that this is due to the fact that the fibers still saturated with sap, are more supple than those in dry wood. The results of some of the tests are shown in Fig. 1, which indicates the relation between the tearing length and the load on the fiber in the testing operation. The curves (a) and (b) refer to fresh wood and the curve (c) to dry wood.

In discussing the effect of conditions of grinding on the wood pulp produced such factors as the nature of the grindstone, the shape of the stone, the speed of the latter, the

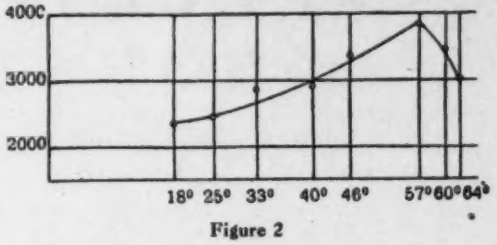

Figure 2

pressure of the wood against the stone and the temperature of grinding are all taken into consideration. Fig. 2 shows the relation between temperature and the strength of the wood pulp. The mechanical strength of the pulp is plotted on the ordinate axis and the temperature in degrees C on the abscissa axis.

The relation between the resistance of the wood pulp and the action of the screens in the screening process is shown

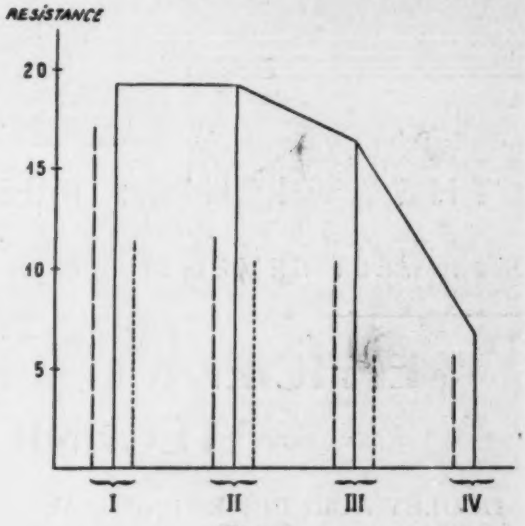

Figure 3

in diagrammatic form in Fig. 3. The mechanical strength is represented by resistance of the pulp to perforation. The dash line (- - -) represents the pulp entering the screening machine, the full line (———) represents the fine pulp from the screen and the dotted line (.....) the coarse pulp. (I), (II) and (III) represent pulps from three screens. A. Ruby, Le Papier, Vol. 33, 1283-1300.

Water Requirements for the Manufacture of Mechanical Wood Pulp

A NUMBER of experiments were carried out to determine the conditions of water consumption in the production of mechanical wood pulp. The action of the water on the mechanical wood results in the dissolving out of a portion of the wood substance. Thus, for example, if the solid ingredients in the water amount to about 54 mg. before use, after one passage through the grinder they have increased to 105 mg. The water appears to dissolve out the acid ingredients in the wood. The experiments were carried out on a magazine grinder of eight to ten tons capacity. Nine hundred sixty kg. of absolutely dry wood are fed to the grinder and 44 cu. m. of water are used per ton of wood during the process. The stock that is obtained from the grinder in admixture with water has a concentration of 2 to 2.2 per cent. The backwater from the knot catcher amounts to 142 cu. m. per ton. This water contains about 0.2 kg. of stock per cubic meter and, furthermore, a certain amount in solu-

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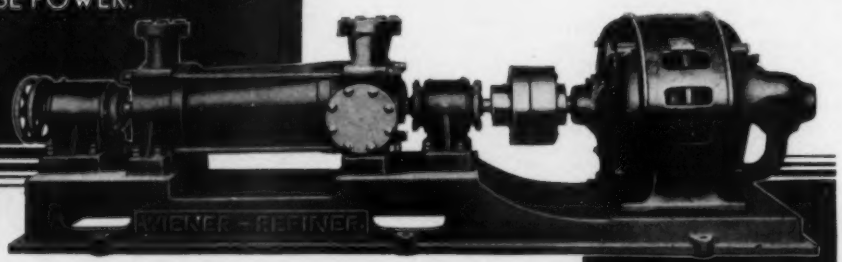

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tion. Forty-five cu. m. of fresh water and 75 cu. m. of backwater and also some refined stock are added before the stock is passed through the screens. The total weight of the mixture is then 446 cu. m. This is passed through the screens and part then goes to the refining engine and part to the pulp machine. The first part contains two per cent stock in 54 cu. m. and the second part 0.22 per cent in 448 cu. m. It is finally calculated that the loss consists of five per cent fiber values and 1.5 per cent of dissolved substance. Furthermore, 1.5 per cent is lost in the spray water on the felts and in the presses. The spray water used is 59 cu. m. and the amount of backwater from the presses is seven cu. m. The backwater is effectively reused in the plant. Fotijew Bumaschnaja Promischlennost, volume 8, pages 143ff.

Automatic Regulation of the Dry Content of Paper, Cardboard, Etc.

THE device that is used for this purpose is seen in the accompanying illustration. The device uses the changes in the length of the paper web or rather of the pull on the paper web, as it is being made in the paper machine, with different dry content as the impulse for regulating the flow of steam to the drying cylinders. It operates as a hydraulic regulator and uses pure water or oil under pressure of more than one atmosphere operating pressure for transmitting the adjusting or regulating force. The use of water under pressure is preferable for the reason that oil undergoes a change in viscosity according to the temperature which has a disturbing effect on the regulating process.

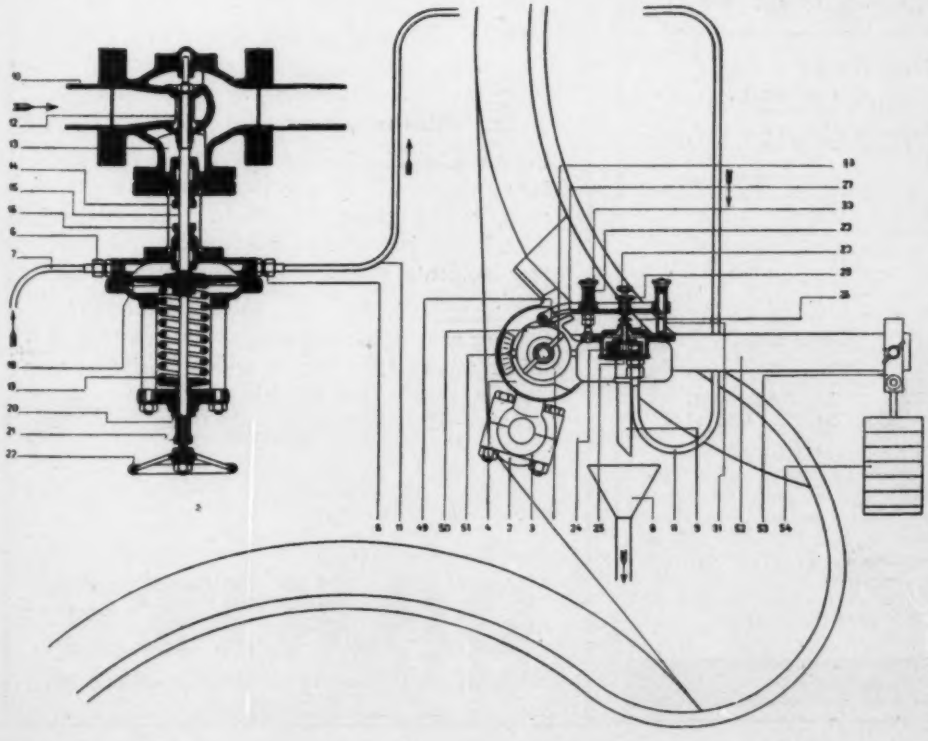
The regulator is built in for the most part at the end of the dry part of the papermaking machine. According to the figure, the shaft (1) is provided with ball bearings (4) on both sides. This shaft carries the contact roller (2) which likewise runs in ball bearings (3) and is pressed against the paper web by means of the weight (54), which is connected to the lever (52). According to the dry content of the paper web, the length of the same changes between the two drying cylinders and hence the position of the contact roller (2) as well. Each change in position of the latter is transmitted through the part (29) and the contact lever (27) to the double-seated regulating valve (25). This regulating valve is built into the pressure liquor line (11).

According to the position of the regulating valve (25), the outlet (9) of the pressure liquor in the regulating valve housing (24) is either open or throttled. Accordingly a pressure change is caused to take place under the membrane (18) of the regulating valve (13). The valve disc (12) which is connected with the membrane therefore throttles the steam connection (10) to the drying cylinders to a greater or lesser degree.

If the moisture content of the paper rises, then the length of the paper web increases between the two contact points of the drying cylinder, that is between the point at which the paper first makes contact and that at which it leaves the cylinder. This increase in length is transmitted to the contact roller (2) and then to the regulating valve (25) which throttles the flow of pressure water and this in turn actuates the regulating valve (13) with the result that the latter opens the steam line to the drying cylinders and the drying effect of the same is materially increased until the moisture of the content of the paper is brought down to standard. If it should go below the standard, then the reverse process, as described above takes place and the flow of steam to the drying cylinders is throttled down. Wochenblatt fuer Papierfabrikation, 1931, pages 48 to 49.

Determining the Chlorine Coefficient According to Roe

THE indirect methods for the determination of the lignin content of pulp (the Enso, Roschier and Bjoerkman coefficients) make the results dependent on the concentration and the quantity of the oxidizing agent used in the determination as well as on the duration of the oxidation. The determination of the chlorine coefficient with the aid of chlorine gas according to Roe is different from these methods. The author has used a modified form of the apparatus. He has been able to make determinations in this apparatus within a period of 25 minutes. The chlorine coefficients which are determined in this manner can be used to establish approximately the probable consumption of chlorine during the bleaching of the pulp. The determination of the chlorine coefficient is recommended in the case of strong sulphite pulps, but the determination of bleachability is more advisable in the case of easy-bleaching sulphite pulps. The chlorine coefficient determined in accordance with the Roe method bears a very close relation to the lignin content of the stock. It is also easy to control the minimum cellulose content by the aid of the Roe chlorine method for certain grades of sulphate pulp. An approximate gradation of sulphite pulps of various degrees of disintegration can also be secured by dipping a sample of the stock into a two per cent aqueous solution of potassium ferricyanide. Easy bleaching pulp color light yellow and the strong pulps a deep reddish brown. This color test gives much better results than the chloride of lime color test. D. Johansson, Svensk Papp. Tidn., volume 33,278.



"Liquid Resin"

THIS is a byproduct of the manufacture of soda cellulose and sulphate pulp. It has also been called "sulphate resin" and "sulphate soap." The properties and composition of this substance are described. It appears to have a number of important and interesting uses. It may be used in the manufacture

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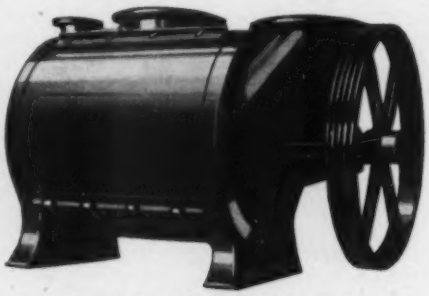

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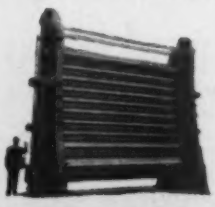
See PAPER AND PULP MILL CATALOG or LOCKWOOD'S DIRECTORY — 1931



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For longer felt service

TO make washing of felts less frequent an operation in your plant, make certain that every trace of dirt, sizing and other foreign matter is thoroughly removed.

Felts washed the Oakite way enjoy longer life for no damage is done to the fibres. Less frequent washings are needed, the number of shut-downs is curtailed, mechanical wear and tear incidental to the washing process are lessened.

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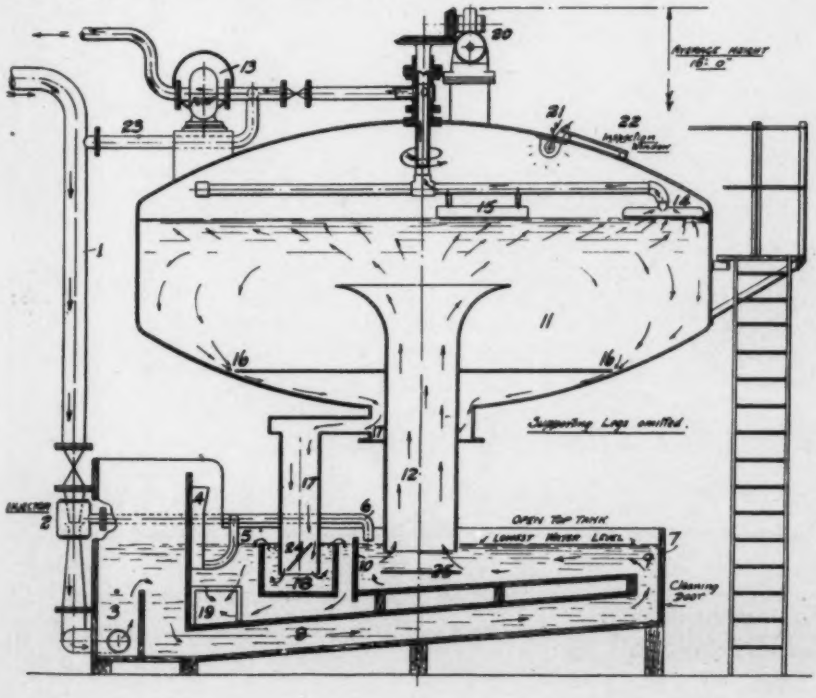
of cement in the place of linseed oil, being used in admixture with an animal or vegetable oil. It can also be used as a starting point in the manufacture of various useful products by distillation at high temperature and under high pressure in the presence of catalytically active substances. Another process calls for the solution of the resin in a mineral oil and the treatment of the solution with concentrated sulphuric acid. A product is obtained which can be saponified and then used for the preparation of emulsions with water and applied in building and construction operations, used for impregnating purposes, etc. The chemical phytosterin can also be obtained from the liquid resin. Other processes of working up the liquid resin to useful products and obtaining these by extraction with solvents, etc. are described. W. Schmid, Der Papierfabrikant, 1931, pg. 1-4.

New Type of Save-All

IN this apparatus, which is shown in the accompanying illustration, the fibers are separated from the water by mechanical process. The operation is accordingly positive and is accomplished without the assistance of felts, fiber matting and the like. The operation of the machine is as follows:

The backwater is pumped through the pipe (1) to the specially made spiral injector (2) into the chamber (3). The object of this injector is to suck in air from the trough (4), pipes (5) and (6), together with any froth that may collect on the surface of the water in the open top tank (7), and to thoroughly aerate the fibers in the backwater passing through the injector (2) to be finally injected into compartment (3). The aerated fibers now pass up passage (8) to the opening (9), which allows the surplus air to escape. The aerated water is divided from the clear effluent by the partition (10) in the tank.

The cylindrical tank (11) is in communication with a lower rectangular tank (7) by the stand pipe (12) with a bell mouth. The aerated fibers are then sucked up into the tank (11) by the pump (13), the end of the suction pipe ending with a scoop (14). The level of the liquid is maintained as shown. There is a partial vacuum in the upper portion of (11), the air being drawn out by the suction pipe and scoop (14), the latter slowly revolving around the tank. The aerated fibers and fillings pass up pipe (12) aided by approximately seven inches of vacuum in (11) and remain floating on the surface of the liquid, being drawn off by the pump (13). The pump (13) discharges the reclaimed pulp to sand tables, stuff chests, etc. The rising pulp in (12) is directed towards the walls of the tank (11) by the bell mouth and aided by the sweeper (15) converges towards the scoop (14). Anon. World's Paper Trade Review, 1931, pages 96 to 102.



Diluting Rosin Size

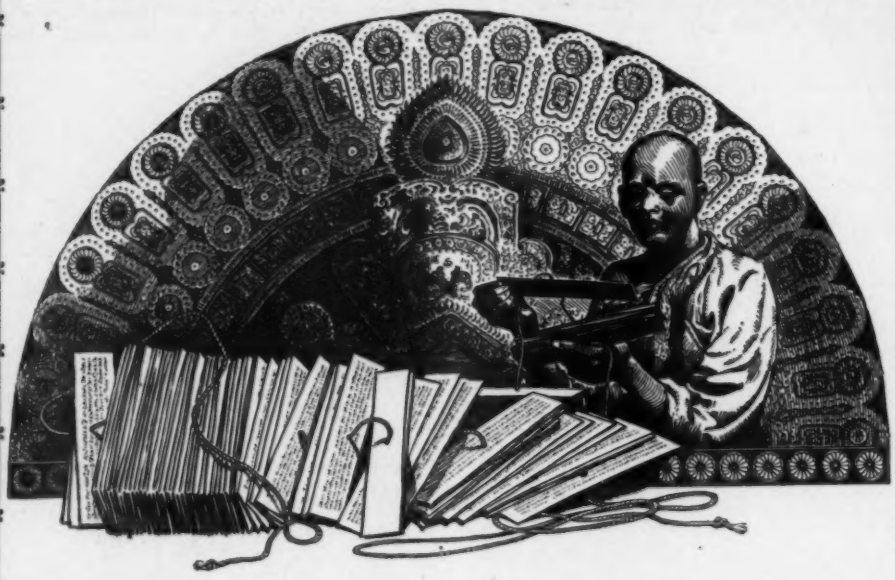
ROSIN size, particularly when it contains a large percentage of rosin, and a small proportion of soda in excess, easily precipitates, when it is diluted with cold water. The precipitate forms along the walls of the container and also sinks to the bottom of the same. The writer has had occasion to observe this many times during his long years of experience in many paper mills. He has seen the bottoms and walls of size tanks completely incrustated with precipitated rosin. He proposed in such cases to remove the rosin size from the tanks into a sufficiently large kettle and to heat the size in the kettle to a temperature of 70 to 100 deg. Cent. and then to allow the rosin size to flow out of this kettle in a thin stream into a tank which is provided with a stirring device and in which the rosin size is to be diluted with cold water. Before the rosin size is permitted to flow into this tank, the water, that is contained in it, is brought up to about the same temperature as the rosin size itself. When this method of diluting the rosin size is employed, the formation of balls of rosin and the precipitation of the free rosin as well as the incrustation of the sides and bottom of the tank with rosin deposited are less apt to occur, than when the rosin size is agitated in the solution tank after being allowed to flow into the same in a large stream and in the cold state. Better results are also obtained by the aforedescribed process than when the temperature of the rosin size and that of the diluting water differ. H. Postl. Wochenblatt duer Papierfabrikation, volume 61, page 1621.

Alpha Cellulose

A NEW method for manufacturing high grade alpha cellulose from chemical wood pulp, according to the specifications, consists of converting incrusting substances into water-soluble compounds by treating the pulp for a period of four to six hours at 20 to 60 pounds pressure with a solution containing two to five per cent caustic soda and one to three per cent sodium sulphite. U. S. patent 1,781,449, 1930.

Determining Cellulose in Wood and Pulp

THE new process is rapid and yields quantitative results when used on various technical wood products. The method consists in a two to three hour boiling with a mixture of 20 parts by volume of nitric acid and 80 parts by volume of alcohol. The boiling operation is not carried out in one stage, but the sample is boiled each time for one hour, the operation being repeated once or twice as the case may be. The result of the treatment is the conversion of the lignin bodies into nitro derivatives, which are soluble. Furthermore, about three-quarters of the weight of pentosans present in the wood are also converted into soluble products by this treatment, while the cellulose remains behind in a pure white state. This process has a disadvantage, when compared with others, in that the hemicellulose is retained in the raw cellulose, but it possesses a marked advantage over the other in that it is very rapid and affords quantitative dissolving out of the lignins. The authors have tested the method in numerous experiments and the results are given in the original article in detailed tabulated form. Various pulps and the like were examined with this method. Comparisons are also made with other existing methods. The literature on the subject is also well reviewed. Dr. K. Kuerschner and A. Hoffer. Technologie und Chemie der Papier und Zellstoff-Fabrikation, volume 26, pages 125-139.



Paper—Servant of Religion and Morality

The human mind demands some set standard of right and wrong. The savage bows down to sticks and stones, knowing no better standard of religious devotion. Civilized man finds morality in a long line of inspired righteousness whose record has been kept and handed on to our generation.

The Hindu reading from his Pali-Text volume of threaded palm leaves, the Chinese with his tinkling invocations painted on dangling glass, the medieval sculptor who expressed devotion in marble and stone, these felt the need of a vehicle for transmitting their homage of a power higher than they.

Our Bibles, our prayer books and our hymnals take religion from limited localities and make it universal and its benefits broadly available. Morality finds a powerful missionary in the garb of paper.

Hammermill Paper Company

Erie, Pennsylvania

New York, March 2, 1931.

GRATIFYING indeed were the reports regarding conditions in the paper industry brought to New York by visiting paper manufacturers and merchants from numerous parts of the country who were in this city to attend the annual gathering of paper men. The paper industry is gradually working out of its depressed situation; the improvement is slow, to be sure, but it is nevertheless consistent, according to representative leaders in the industry from various sections of the United States. Buyers are gradually evincing more interest and are increasing their purchases; mills are obtaining larger orders and are finding it necessary to quicken their operations to some extent, while the market is exhibiting greater stability and the price condition tends better.

There seems little or no doubt that business in paper is on the mend. The market at the important consuming and distributing center of New York is developing broader activity; more buyers are coming into view day by day, and not only are they operating in the market in freer fashion but they are enlarging the scope of their buying by placing orders for bigger amounts of paper. Without question this reflects improved conditions in the paper consuming fields, because it is an accepted fact that no change has as yet taken place in the attitude of buyers—they are still confining purchases to actually and directly required supplies, and are refusing to stock up. Consequently the broader demand for paper must mean better activity in the consuming lines, and a resultant increased need of paper.

Nearly all the advices reaching New York tell of paper and board mills finding it necessary to speed up their manufacturing operations to some degree. The volume of incoming orders has consistently increased since the beginning of the year; large consumers who buy direct from mills are taking bigger tonnages of paper while jobbers all over the country are absorbing larger supplies, and indications are the gradual expansion of demand will continue for sometime or at least until the customary summer lull commences. General opinion is that business will improve during the spring months and will attain much broader dimensions before the mid-year slowing down. As regards next fall and winter, optimism is running high in nearly all corners of the trade, and it is interesting to note that predictions in common by bankers, economists and others are that general business will reach excellent proportions in the late months of this year.

Production of paperboard in the United States during the calendar year 1930 reached a total of 2,695,214 net tons, according to statistics compiled by the U. S. Department of Commerce in Washington and therefore official, showing a sharp decrease as compared with 2,951,734 tons produced in the preceding year. Board output last year was at a rate of 68.8 per cent of mills' capacity, against 75 per cent during 1929, mills operating an aggregate of 96,771,692 inch hours in 1930, compared with 109,020,950 inch hours in 1929. Shipments of board from mills during 1930 totaled 2,687,098 tons, or within 8,000 tons of the production for the year, contrasted with 2,945,927 tons shipped in 1929, and stocks of board at producing mills at the end of last year were 71,661 tons, against 63,545 tons at the close of 1929. New orders received by manufacturers during the entire of 1930 called for 2,682,058 tons, contrasted with 2,909,210 tons in the preceding year, and unfilled orders held by mills at the end of 1930 were for 53,572 tons, against 58,612 tons at the end of 1929.

Production of newsprint in the United States in January amounted to 105,527 tons, contrasted with 99,276 tons in December and 124,851 tons in the similar month last year, or at 69 1/10 per cent of rated capacity in January, against 68 8/10 per cent in December and 85 3/10 per cent in January, 1930, according to the News Print Service Bureau. Production by Canadian mills in January totaled 184,339 tons, compared with 184,755 tons in December and 206,305 tons in January last year, or at 57 3/10 per cent of rated capacity in January, against 59 5/10 per cent in the preceding month and 71 4/10 per cent in January a year ago. The total United States and Canadian output of newsprint in January reached 289,866 tons, or at 61 1/10 per cent of mills' rated capacity, contrasted with 284,031 tons or 62½ per cent in December last, and 331,156 tons or 76 1/10 per cent of capacity in January, 1930.

One of the features of the market is the widening demand for fine papers. New York mill agents and jobbers with few exceptions report a distinctly better call for bonds, ledgers and writings, it being estimated in some parts of the trade that demand has increased fully 20 per cent since the outset of the year. Book papers also are in broader demand, both from contract buyers and those operating currently in the market. Tissue papers are moderately active, and display indications of developing more market activity.

Newsprint is moving into consumptive channels in a steady way, and signs point to some little increase in consumption during recent weeks. Department stores and other retailers are commencing to display spring merchandise and are utilizing larger space in the daily newspapers to advertise their wares, with the result publishers have added pages to their editions and are consuming more print paper. No discussion at all is heard concerning newsprint prices, and it seems reasonably sure that prevailing prices will be adhered to throughout this year.

Board is showing greater price stability and is enjoying somewhat better market activity. Consumers are buying steadily but are covering immediate needs only. However, manufacturers are maintaining quotations, and appear determined to obtain the prices named.

Westinghouse Temporarily Reduces Working Hours

Effective March 1, all the works and offices of the Westinghouse Electric and Manufacturing Company will omit Saturday operations, except as involved in maintaining adequate service with customers and others with whom the company does business, according to an announcement by President F. A. Merrick.

Mr. Merrick's announcement states that the plan to be followed for the immediate future is to shorten the working week to the extent represented by the work normally required on Saturday throughout the company. As this reduction of service represents approximately ten per cent, that amount of reduction will apply to all salaried employees. Similar arrangements have already been put into effect as to employees on an hourly basis.

Mr. Merrick emphasizes the point that this arrangement is solely an emergency measure to spread the work through this period of severe business depression and that normal arrangements will be reinstated with the advent of normal times.

Robert Gair Company, New York City, announces price on Standard 85 Test Liner, effective February 19, 1931, $35.00 to $37.50 per ton, adjusted for contract quantities, spot deliveries, $40.00, representing continuation of 1930 base price. Standard chip, news and manila board prices remain unchanged.

Of course it will be—

DIAMOND liquid CHLORINE

BEHIND the door of the Purchasing Department, materials for a paper mill are being discussed . . . their relative merits are being carefully weighed in the light of past experience. Then the question of liquid chlorine comes up. Of course, it will be "DIAMOND,"—its record in the mill speaks for itself.

Satisfactory past experience plays an important part in leading many paper manufacturers to specify DIAMOND LIQUID CHLORINE . . . always of the very highest quality . . . always readily available in any quantity you may require.

Diamond Alkali Company
Pittsburgh, Pa. *and Everywhere*

DIAMOND *Liquid* CHLORINE

Papermaking Rags

There is, at best, a restricted demand from paper mills for rags. Indications are that most manufacturers have ample supplies on hand to enable them to hold aloof from the market except for occasional purchases of small lots of certain grades of rags for filling-in purposes, and demand emanating from consuming quarters is—from an aggregate standpoint—far under what can be called normal volume. This is particularly true as regards the high and medium grades of papermaking rags; activity in the low or roofing descriptions is considerably more pronounced, such as it is, and a decidedly steadier price tone characterizes the cheaper than the better grade rags.

In a general sense, the price condition is altogether in favor of those on the buying side of the market. It is true that values of roofing grades have firmed slightly of late, and that consumers of these rags are facing a somewhat firm supply market situation, owing to the decrease in collections throughout the country and to a drastic fall in importations, but just the opposite is the case in the higher or writing paper grades of rags. Doubtless the production of new cuttings has declined substantially, and without question the output of the medium grades, such as old whites and blues, has diminished, yet there is something of a surplus in the market, and with it a price condition advantageous to buyers. In short, demand is insufficient to take up the supply available, and buyers consequently have matters much their own way as concerns the prices they have to grant to secure the rags desired.

On the other hand, dealers and importers are putting considerable emphasis on the subnormal amounts of rags reaching the market, and are insisting that should mills' requirements expand but moderately and manufacturers were forced into the market to increase their purchases only slightly, the likelihood is market rates would quickly and appreciably rise. At the moment, however, supply is overshadowing demand, and the market is anything but firm, with prices in some cases decidedly on the easy side and with consumers being importuned to place orders almost regardless of price so long as they will grant prices within reasonable bounds.

New cotton cuttings of most grades are in particularly slow call. Paper manufacturers are buying in a very spasmodic fashion, absorbing supplies in a limited way as their needs dictate, and seldom if ever showing any disposition to buy cuttings to place in their warehouses. Prices therefore are on the downtrend, with new low levels registered in recent transactions. In some instances, it is difficult indeed to ascertain what certain grades of cuttings actually are worth, since buyers are not interested in such rags and since sellers are unaware what to ask while having no definite transactions on which to base their ideas of price.

New No. 1 white shirt cuttings are reported available to mills at 7.25 cents per pound f.o.b. dealers' shipping points, and probably at slightly less, while new fancy shirt cuttings are offered at 3.75 cents a pound, new unbleached cuttings at 7.50 cents, new blue overall cuttings at 5.50 cents, No. 1 washables at 3.50 cents, and new light silesias at 5.50 cents.

Roofing rags have advanced slightly to where dealers now ask 95 cents to $1 per hundred pounds for No. 1 packing and 70 cents for No. 2 domestic stock at points of shipment, while imported roofing rags are held at 1.05 cents a pound for linsey garments and 85 cents per hundred pounds for dark colored cottons ex dock New York or other American Atlantic ports. Old whites and blues are steady quotably although most transactions are at the low edges of quotational ranges. Foreign rags, both new and old, are in slack demand and are generally selling at prices slightly below relative levels of domestic rags of comparable grades.

Average quotations f.o.b. shipping points and ex dock New York, some of which should be considered as nominal, are as follows:

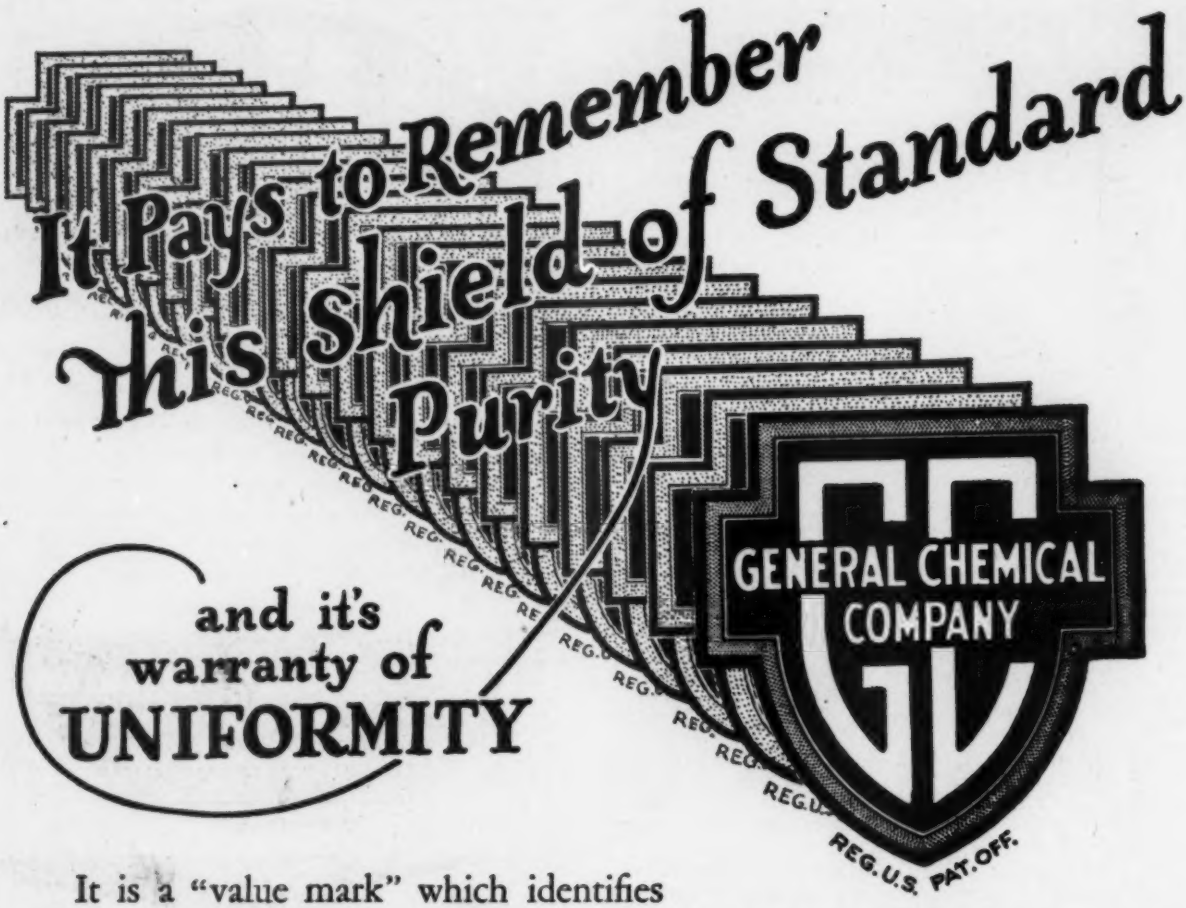
New Stock—	New York and Chicago
White shirt cuttings, No. 1	7.00– 7.50
White shirt cuttings, No. 2	4.50– 5.00
Fancy shirt cuttings	3.50– 3.75
Washables, No. 1	3.50– 3.75
Unbleached muslins	7.25– 7.50
White lawns	6.00– 6.25
Overall cuttings, blue	5.50– 5.75
Black silesias	3.50– 3.75
Canton flannels, bleached	6.50– 6.75
Canton flannels, unbleached	5.50– 5.75
Shoe cuttings, bleached	5.50– 5.75
Shoe cuttings, unbleached	4.50– 4.75
Light silesias	5.25– 5.50
O. D. khaki cuttings	4.75– 5.00
Mixed khaki cuttings	3.75– 4.00
Corduroy cuttings	3.00– 3.25
Cottonade cuttings	2.75– 3.00
Linens, No. 1 white, foreign	10.00–10.50
Light prints, foreign	2.75– 3.00
Old Stock—	
Whites, No. 1, repacked	4.50– 5.50
Whites, No. 2, repacked	2.25– 2.75
Whites, house soiled	2.00– 2.25
Whites, street soiled	1.75– 2.00
Thirds and blues, rough	1.00– 1.25
Thirds and blues, repacked	1.50– 1.75
Lace curtains	4.00– 4.25
Black stockings	3.50– 3.75
Cotton canvas, No. 1	3.75– 4.00
White cotton batting	1.25– 1.50
Roofing No. 1 (cloth strippings)	.90– 1.00
Roofing, No. 2	.70– .75
Linsey garments, foreign	1.00– 1.05
Dark colored cottons, foreign	.85– .90
Blue linens, foreign	2.75– 3.00
Gray linens, foreign	3.00– 3.50
White linens, foreign	5.50– 6.00
Light prints, extra foreign	1.75– 2.00

Rope and Bagging

Paper mill demand for old rope is very dull; in fact, most reports say that there is almost no sale for this raw material, while consumers are well supplied against current requirements and are unwilling to augment their stocks. Prices are weak, and uncertain at approximately 2.50 cents per pound for No. 1 domestic old Manila rope, and about this same level for imported old rope. Bagging of some grades, on the other hand, is in fair call, more especially gunny bagging and roofing bagging, and prices evince steadiness. No. 1 gunny is around 1.65 cents a pound f.o.b. shipping points, and mills are reported to have paid 70 and 75 cents per hundred pounds for roofing bagging. No. 1 scrap bagging is in routine demand on a price basis of 1.40 to 1.50 cents per pound at dealers' shipping points.

F.o.b. shipping point and ex dock New York quotations follow:

Gunny, No. 1 domestic	1.65– 1.70
Gunny, No. 1 foreign	1.60– 1.65
Scrap bagging, No. 1	1.40– 1.50
Roofing bagging	.65– .75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283

Wool tares, heavy	1.65– 1.75
Wool tares, light	1.55– 1.65
Manila rope, No. 1 foreign	2.40– 2.60
Manila rope, No. 1 domestic	2.50– 2.75
Sisal strings	1.50– 1.75
Mixed strings	.70– .80

Old Paper

The market for old paper displays a somewhat improved undertone; demand for some grades has increased at least to an extent, and prices appear to be holding their own better than was the case until recently. Doubtless the severe curtailment of collections in various parts of the country, and also the inclement weather which has further reduced the gathering of material, are factors lending strength to the situation, and there are signs that available supplies of certain grades are none too plentiful although ample to fill consumers' wants at present.

Folded newspapers seem in best demand, and market prices range around $6 a ton f.o.b. shipping points in the East and $10 in the Middle West. Heavy book stock is moving relatively well on a price level of 75 to 90 cents per hundred pounds at dealers' points, while soft white shavings of No. 1 quality are bringing 2.15 to 2.50 cents a pound, and No. 1 hard white shavings 2.40 to 2.90 cents, according to quality. Mixed paper remains more or less in the doldrums, and consumers in the East are buying No. 1 mixed at as low as $2.50 a ton f.o.b. shipping points though higher prices prevail in the West.

The following quotations f.o.b. shipping points are largely nominal:

	New York and Chicago
Hard white shavings, No. 1	2.40– 2.90
Hard white shavings, No. 2	2.25– 2.50
Soft white shavings	2.15– 2.50
Colored shavings	.50– .60
Heavy book, No. 1	.75– .90
Crumpled book, No. 1	.60– .65
Ledger stock	.60– 1.00
Kraft No. 1	1.00– 1.15
New kraft cuttings	1.50– 1.75
White blank news	1.60– 1.75
Manilas, No. 1	.40– .60
Manilas, container	.20– .30
Folded news	.30– .50
Sulphite mill wrappings	.50– .60
Old corrugated boxes	.40– .45
New corrugated box cuttings	.50– .55
Mixed paper, No. 1	.12– .30
Common paper	(Nominal)

Pulpwood

The cut of pulpwood in most regions this winter has been fairly heavy, according to reports. The market at present is possessed of a fairly steady tone, and quotations are maintained without change of importance.

Exports of pulpwood from Canada in January amounted to 79,018 cords, valued at $712,116, showing a sharp decrease as compared with 120,063 cords of a value of $1,135,348 exported in the same month last year.

Mechanical Pulp

Mechanical wood pulp is moving in a moderately consistent fashion into consuming channels, and market prices are sustained. Demand, insofar as the open-market call for supplies is concerned, is spotty, but consumers are now and then absorbing fair-sized tonnage through current purchases, while the contract movement keeps up in a steady manner and is of good volume. Domestic groundwood is quoted around a price basis of $28 per ton f.o.b. pulp mills, and Canadian groundwood at $25 upwards a ton at shipping points, depending on the freight to consuming centers and the air dry test.

Production of groundwood in the United States during the calendar year 1930 amounted to 982,081 net tons, according to identical mill reports to the American Paper and Pulp Association, compared with 1,042,310 tons produced by the same mills in 1929, and 1,019,731 tons in 1928. Last year's ground-

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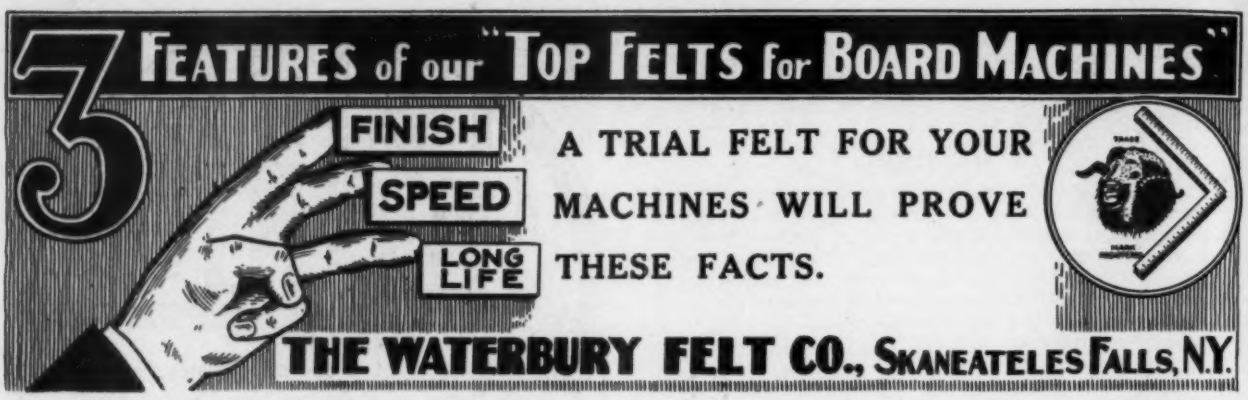
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Pulp Screens
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wood output was the smallest in seven years, based on identical mill statistics.

Chemical Pulp

Domestic manufacturers of chemical wood pulp are moderately busy, it is reported, with most of the activity in the market having to do with shipments against contracts. Current demand is comparatively slow, although consumers in some cases are in evidence as buyers and are infrequently absorbing fair tonnages. Competition of Pacific coast producers is exceedingly keen, and is a considerable market factor; in fact, it is no secret that pulps from this source have supplanted other pulp in some of the large eastern paper mills. Moreover, domestic producers are being obliged to meet the prices named on foreign pulps, which in many instances are unusually low, and it cannot be said that the price position is at all satisfactory to sellers.

Domestic bleached sulphite is available at as low as 2.65 cents per pound for West coast grades ex dock Atlantic seaboard, with other mill brands priced at far above this level or as high as 4.50 and 4.75 cents for some of the fine bond paper qualities. Unbleached sulphite of domestic origin is around 2.50 cents a pound at pulp mills for book grades, and 2.25 cents for news qualities. Bleached soda pulp is selling at 3 to 3.25 cents per pound delivered paper mills, and domestic kraft pulp ranges anywhere from 1.80 cents a pound f.o.b. pulp mills for southern kraft up to 2.75 cents and higher for No. 1 eastern grades.

The total production of chemical wood pulp in the United States during 1930 reached 1,440,353 net tons, contrasted with 1,555,531 tons produced by identical mills in 1929, and 1,487,244 tons in 1928, according to statistics compiled by the American Paper and Pulp Association.

Quotations f.o.b. pulp mills are as follows:

Bleached sulphite	2.65– 4.75
Easy bleaching sulphite	2.50– 2.75
Unbleached sulphite, No. 1 strong (news grade)	2.25– 2.50
Unbleached sulphite, No. 1 book	2.40– 2.65
Soda pulp bleached (delivered)	3.00– 3.25
Mitscherlich, unbleached	2.75– 3.00
Kraft, No. 1	1.80– 2.75
Screenings, refined	(Nominal)

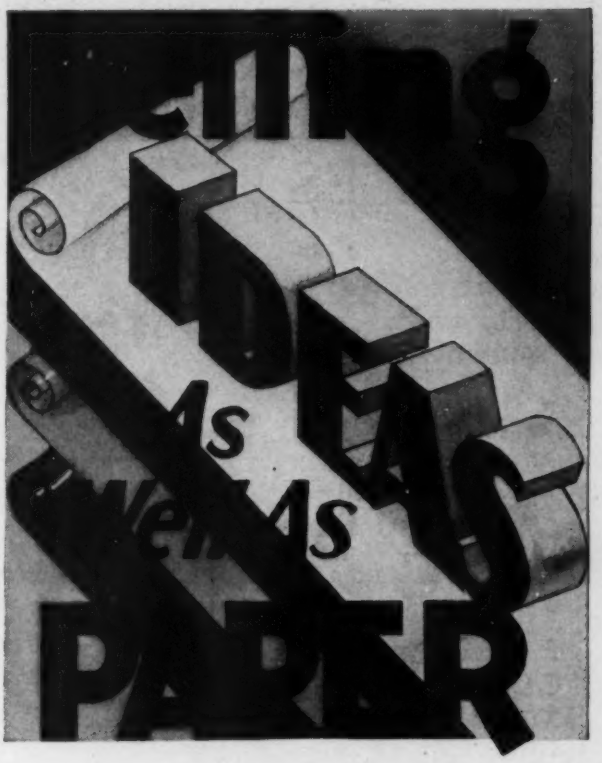
Chemicals

Casein prices have receded a bit more, and supplies are now reported available in some quarters down to 8.50 cents per pound for domestic standard ground casein, with quotations ranging up to 12 cents for finely ground. Bleaching powder is steady quotably under a fairly consistent demand of routine dimensions, and no changes are reported in prices of soda ash or caustic soda. Contract movement comprises the principal activity in the chemical markets.

Average quotations are as follows:

Alum, lump ammonia	3.50 – 3.75
Alum, lump starch	3.75 – 4.00
Blanc fixe, powdered	3.75 – 4.00
Bleaching powder	2.00 – 2.35
Brimstone (long ton, at mine)	18.00 –20.00
Casein (duty paid)	8.50 –12.00
Caustic soda, solid, spot delivery	2.50 – 2.55
China clay, domestic washed	8.00 –13.00
China clay, foreign	15.00 –21.00
Rosin, Grade E	5.20 – 5.40
Satin white	2.00 – 2.25
Soda ash, 58 per cent light (bags)	1.15½– 1.25
Starch, papermakers', in bags	3.12 –.....
Talc (ton)	16.00 –18.00

Announcement is made that nearly a million dollars was paid to pensioners by the General Electric Company during 1930. On the last day of the year there were 1,287 pensioners, averaging 69.20 years of age and having been employed by the company for an average of 28.77 years before retirement; the ages of the men totalled nearly 90,000 years, and their service with the company totalled more than 37,000 years. The pension payments in 1930 averaged $817.



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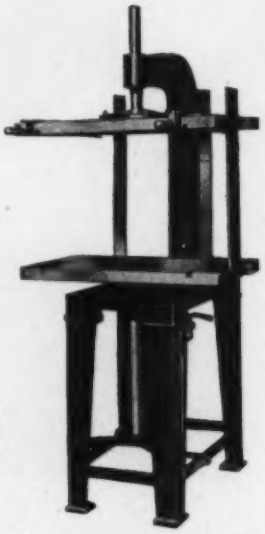

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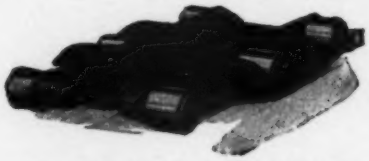

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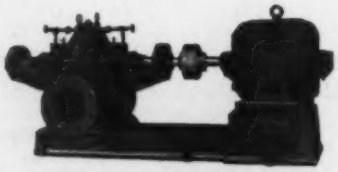

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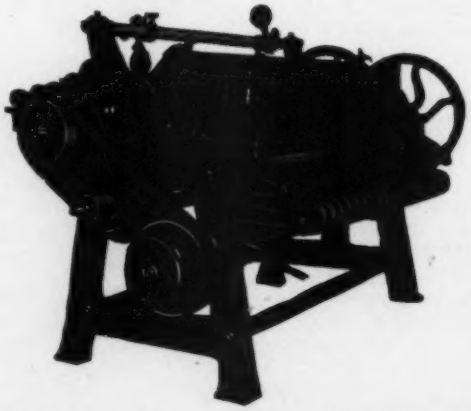

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New Papers

Writing—	
White rag	16–40
White sulphite	8–30
Colored rag	15–40
Colored sulphite	8–30
Ledger—	
White rag	16–40
White sulphite	10–30
Colored sulphite	10–30
Colored rag	15–40
Bond—	
White rag	16–40
White sulphite	7–30
Colored sulphite	7–30
Colored rag	15–40
Book—	
No. 1 S. & S. C.	5.75– 8.00
Machine finished	5.50– 8.00
English finish	5.50– 8.00
Coated and enameled	7.00–11.00
Lithograph, M. F.	7.50–12.00
Newsprint—	
Rolls, contract, per ton, delivered New York	62.00–
Rolls, transient, per ton, delivered New York	62.00–
Sheets, per ton, delivered New York	67.00–
Sideruns, per ton, delivered New York	47.00–52.00
Cover Stock—	
Coated, both sides	–10.25
Coated, one side	–10.15
Tissue—	
No. 1 white, 20x30	.70– .80
No. 2 white, 40x36	.65– .75
No. 1 Manila, 24x36	.65– .75
Kraft	.85– .90
Wrapping—	
No. 1 kraft	4.50– 5.25
No. 2 kraft	3.25– 3.75
Southern kraft	3.25– 3.75
Boards—	**New York and Chicago**
Solid news	35.00–40.00
Straw	45.00–50.00
Plain chip	30.00–32.50
White coated chip	47.50–50.00
Manila coated chip	42.50–45.00
Binders' board	65.00–70.00

Paperboard Industry Moves to Minimize Unemployment

The paperboard industry is organizing to minimize unemployment within its ranks, according to a statement received by Colonel Arthur Woods, chairman of The President's Emergency Committee for Employment, from J. H. Macleod, president of the Paperboard Industries Association.

The following committee has been formed of paperboard executives who will act to assemble and apply all sound methods applicable to their type of work: J. L. Barchard, Hummel & Downing Co., Milwaukee, Wis., chairman; Hugh Strange, John Strange Paper Co., Menasha, Wis.; C. H. Andrews, National Folding Box Co., New Haven, Conn.; E. V. Donaldson, Robert Gair Co., New York City; H. I. Schmidt, Schmidt and Ault Paper Co., York, Pa.; R. H. Dollison, Fairmont Box Co., Fairmont, W. Va.

Action in Paper Import Cases

That the four months from Oct. 1 to Feb. 1 showed action taken by the customs officials involving paper to a value of nearly $5,000,000 is told in a special report recently made by the Import Committee of the American Paper Industry.

Court decisions alone in that four-month period raised the duty classification or increased the dutiable value of paper valued at over $1,250,000. Administrative action taken by customs officials in the same period, not included in decisions by the customs courts applied to papers with an annual value of $1,800,000, and much of this paper is now being so classified for duty that it will be possible for domestic mills to secure much of this tonnage.

In addition to these items, the placing of a duty on novel and tablet news formerly imported duty free as standard newsprint applies to imports totaling about $1,800,000.

This report was made as an answer to friendly critics that the work of the Import Committee for the paper industry is not appreciated fully because of a failure to show the importance of its accomplishments in terms of dollars.

Since Oct. 1 the customs courts have rendered decisions favorable to the domestic mills in 1,348 cases, each involving at least one separate importation. The contentions of the importers have been sustained in only 248 cases, while this period saw the initiation of 440 new cases in which either misclassification or undervaluation was suspected.

Imported Kraft Undervalued—The question of undervaluation of kraft paper imported from Sweden is before the customs officials in the belief that the price at which this paper is exported to the United States is below the home market value. Total imports of kraft wrapping total about $750,000 a year, and nearly all is of high quality. The Import Committee has long been contending that the paper was not being properly valued for duty purposes, as the result of a technical decision by the customs courts before the Import Committee was formed. If the situation is as represented, a new test case will result.

Coffin Awards Made to 38 G. E. Employees

Employees' ideas, resulting in valuable contributions to the progress and efficiency of the General Electric Company, were recognized and rewarded February 20 by the Charles A. Coffin Foundation, established by that company in 1922. Awards of merits, consisting of a certificate and a monetary consideration, were made to 38 General Electric men representing many classes of workers and scattered among the company's various factories and commercial offices.

Since the establishment of the Coffin Foundation, eight years ago, 279 awards have been made to employees of the General Electric Company. The foundation is a memorial to the first president of the company.

National Exposition of Mechanical Handling

What is expected to fill an important industrial need has been announced for the week of November 30 to December 5 inclusive, in Grand Central Palace, New York. This is to be the first National Exposition of Mechanical Handling, an initial effort to feature exclusively this special type of equipment.

The exposition will be conducted under the same management as the National Exposition of Power and Mechanical Engineering, the International Heating and Ventilating Exposition, the Chemical Industries Exposition and the National Hotel Exposition, all of which are under the management of the International Exposition Company.

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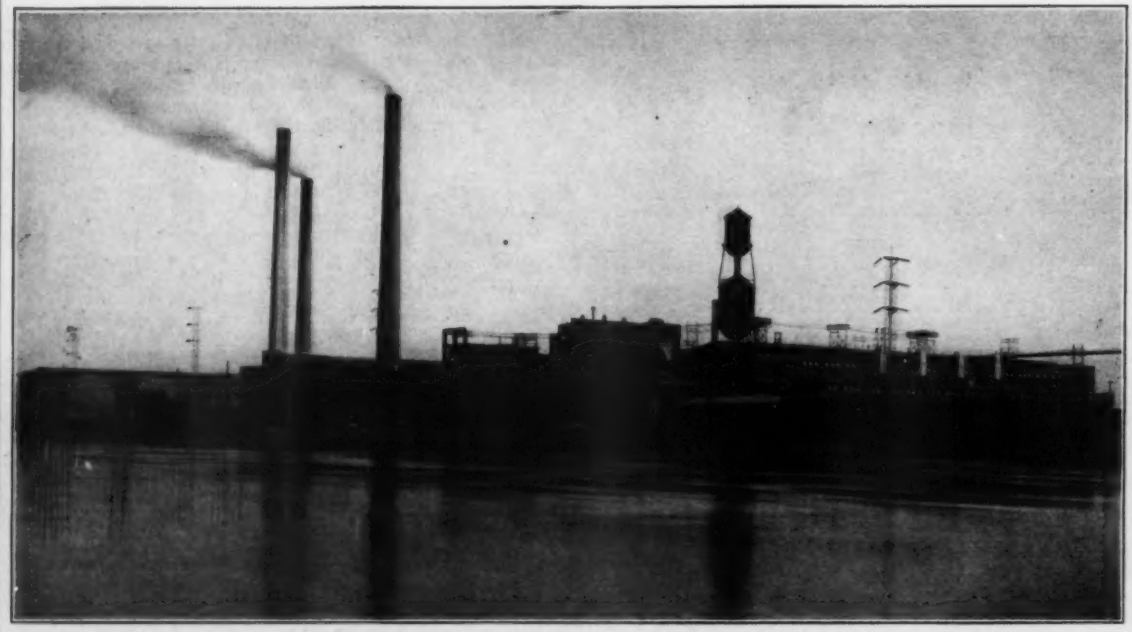
WAYAGAMACK PURE KRAFT

Kraft Pulp and Easy Bleaching Sulphate

Quality Pulp



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Sole Selling Agents for United States for

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EXPORTS

Exports of paper and paper products from the United States during the calendar year 1930 registered a considerable decrease, in point of total value, as compared with the preceding year. Total exportations last year reached a value of $30,301,759, according to official statistics compiled by the U. S. Department of Commerce in Washington, against shipments aggregating $37,086,009 in value in 1929. Exports of nearly all the principal classes of paper recorded a decline last year as contrasted with the year before.

Newsprint exports in 1930 amounted to 20,408,360 pounds, valued at $812,231, compared with 37,390,727 pounds of a declared value of $1,345,873 in the preceding year, with the principal shipments last year to the Philippine Islands, South America, Cuba, and China and Hong Kong, in the order named. Uncoated book paper exports last year reached a total value of $2,155,175, against $2,651,325 in 1929, while wrapping paper exports in 1930 were valued at $2,759,441, contrasted with $2,957,204 in the preceding year. Writing paper exports in 1930 were valued at $2,070,040, showing a decrease as compared with shipments valued at $2,955,732 in 1929, and tissue and crepe paper exports dropped from a value of $1,061,250 in 1929 to $919,036 in 1930.

Boxboard and strawboard exports last year were valued at $1,498,914, contrasted with $1,424,446 the year before, while other paperboard exports were valued at $1,606,638, against $2,096,850 in 1929. Paper box exports reached a value of $1,370,631, compared with $1,891,939 in 1929, and paper bag exports decreased from a value of $1,009,789 in 1929 to $892,538 last year.

IMPORTS

Wood Pulp

Total importations of wood pulp of all kinds—mechanical and chemical—into the United States during the calendar year 1930 amounted to 1,636,520 long tons, according to official figures compiled by the U. S. Department of Commerce, of a declared value of $81,286,794, showing a decrease as compared with 1,685,272 tons of a value of $89,085,996 imported in 1929. Imports of chemical pulp last year reached 1,369,327 long tons of all grades, valued at $74,140,504, while receipts of mechanical pulp for the year were 267,183 tons of a value of $7,146,290.

The 1930 imports of groundwood recorded a gain over the 244,162 tons of a value of $6,245,776 imported in the preceding year, whereas chemical pulp imports fell below the total of 1,441,110 long tons of a value of $82,840,220 in 1929. Nevertheless, the imports of chemical pulp last year were the largest ever known in any year with the single exception of 1929, in view of which and considering the business depression which existed during most of last year, pulp imports for 1930 held up to a remarkably high level.

Imports of chemical pulp into the United States in 1930 were divided 323,086 long tons of bleached sulphite of a value of $22,727,052, against, 334,235 tons of a value of $25,338,603 in 1929; 665,049 tons of unbleached sulphite of a value of $33,193,598, against 701,456 tons of a value of $35,328,982 in 1929; 357,351 tons of unbleached sulphate or kraft pulp of a value of $16,447,258, against 384,005 tons of a value of $20,518,676 in 1929; 19,533 tons of bleached sulphate, valued at $1,468,599; 1,932 tons of soda pulp of a value of $126,470, and 2,376 tons of miscellaneous pulp, valued at $177,527.

The market for imported wood pulp appears to be developing a somewhat firmer undertone. At any rate, sellers are displaying a stronger attitude and are not pressing sales; in fact, it can be said that they are bent on receiving certain minimum prices for pulp, and are not hesitating to turn down bids which fail to come up to their price ideas. Producers in Scandinavia and elsewhere in Europe evidently anticipate a slightly higher market level, and are mostly naming prices a little advanced from the low figures at which sales were registered recently. At the same time, consumers are buying cautiously, and little or no difficulty is experienced by them in obtaining all the pulp desired. No such thing as a shortage exists, and occasionally some resale lots of pulp are coming onto the market which buyers are acquiring fairly cheaply. All in all, however, the market is possessed of a firmer tone than has been apparent in a long while, and it would certainly seem as if the worst has been seen in the pulp market.

Sellers of foreign kraft pulp are asking slightly higher prices. Where sales of prime Scandinavian kraft were made not long ago at 1.50 and 1.55 cents a pound ex dock New York and other American Atlantic ports, prices now demanded are around 1.65 cents, and some of the finer qualities of kraft are held firmly for up around 1.75 cents. Strong unbleached sulphite is steady at 2.10 cents upwards per pound ex dock, with most quotations ranging from 2.15 to 2.25 cents and prime bleached sulphite is quoted from 2.80 cents upwards ex dock with as high as 4 to 4.25 cents wanted for extra desirable grades. Prime easy bleaching sulphite is held at 2.30 to 2.50 cents per pound, and ordinary unbleached Mitscherlich sulphite at around 2.15 cents ex dock.

Foreign groundwood of prime quality is fetching $31 per short ton ex dock American Atlantic seaboard for dry, and around $29 a ton for moist pulp. Demand for such pulp is fair, with a considerable movement reported on contracts.

Current market quotations ex dock New York, and receipts at the port of New York during February, 1931, these data being taken from vessels reaching that port last month, follow:

Bleached sulphite, No. 1	2.80– 4.25
Unbleached sulphite, strong No. 1	2.10– 2.30
Unbleached sulphite, No. 2	1.90– 2.10
Easy bleaching sulphite	2.30– 2.50
Mitscherlich, unbleached, genuine	2.60– 2.80
Mitscherlich, unbleached, ordinary	2.10– 2.25
Kraft, standard Swedish	1.50– 1.75
Groundwood, per ton (dry)	30.00–31.00

Bulkley, Dunton & Co., 4,200 bales from Hernosand, 110 Rotterdam, 9,750 Iggesund, 1,000 Gefle, 1,000 Hamburg and 21,200 Stugsund; Price & Pierce, Ltd., 1,200 bls. from Hernosand and 125 Gothenburg; E. M. Sergeant Co., 449 bls. from Gothenburg and 300 Oslo; M. Gottesman & Co., 2,550 bls. from Gothenburg, 1,575 Rotterdam and 3,350 Iggesund; Parsons & Whittemore, 510 bls. from Gothenburg; Perkins-Goodwin Co., 315 bls. from Gothenburg; Castle & Overton, 1,950 bls. from Hamburg; Pagel, Horton & Co., 625 bls. from Gefle; Lagerloef Trading Co., 1,085 bls. from Helsingfors, 3,610 Hango, 1,676 Rauma and 1,173 Kotka; New Haven Pulp and Board Co., 15,017 bls. and 1,828 half bls. groundwood from Lunenburg, N. S.; Robert Gair Co., 3,997 bls. and 388 half bls. groundwood from Lunenburg, N. S.; Irving Trust Co., 175 bls. from Bremen; J. Andersen & Co., 5,820 bls. from Oslo; Atterbury Bros., 1,800 bls. from Oslo; Johaneson, Wales & Sparre, 200 bls. from Oslo; Guaranty Trust Co., 629 bls. from Hamburg; E. J. Keller Co., 361 bls. from Hamburg; Brown Bros. & Co., 434 bls. from Hamburg; A. P. W. Paper Co., 8,553 bls. groundwood from Sheet Harbor, N. S.; Chemical Bank & Trust Co., 1,500 bls. from Oslo; Order, 15,600 bls. from Hernosand, 20,000 Norrsundet, 945 Tolkis, 621 Hamburg and 500 Oslo.

Paper Stock

Imports of rags for papermaking into the United States recorded a big decrease last year as compared with the preceding year. Statistics compiled by the U. S. Department of

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Commerce, and therefore official, put the total importations of papermaking rags during the calendar year of 1930 at 281,592,177 pounds, of a declared value of $5,565,340, compared with 446,496,028 pounds of a value of $9,341,795 in 1929. Imports of other paper stock excepting wood pulp reached a total of 221,568,051 pounds, valued at $3,052,291, last year, also showing a considerable decline as contrasted to 272,700,303 pounds of a value of $5,106,000 in the previous year.

Imports of papermaking material last month were rather light, judging by arrivals through the port of New York. Receipts of all kinds of paper stock excepting wood pulp at that port in February, these data being taken from manifests of steamers reaching New York and therefore unofficial, were as follows:

Old Rope—William Steck & Co., 109 coils and 124 bls.; Brown Bros. & Co., 98 bls. and 239 coils; Chemical Bank & Trust Co., 229 coils; United Fruit Co., 2 bls.; International Purchasing Co., 163 coils; E. J. Keller Co., 65 coils; Order, 51 coils.

Old Bagging—Darmstadt, Scott & Courtney, 295 bls.; E. J. Keller Co., 305 bls.; Banca Commerciale Italiana Trust Co., 714 bls.; Chase National Bank, 148 bls.; International Acceptance Bank, 51 bls.; Order, 150 bls.

Rags—Castle & Overton, 32 bls.; Atlas Waste Mfg. Co., 15 bls.; J. Cohen & Sons, 59 bls.; R. Canovai & Sons, 46 bls.; Harmon G. Lichtenstein, 91 bls.; J. Reiss & Co., 34 bls.; Baltic Shipping Co., 25 bls.; International Acceptance Bank, 204 bls.; Barrett Co., 189 bls.; S. Birkenstein & Sons, 66 bls.; Fritz Stern, 134 bls.; Chase National Bank, 34 bls.; E. Butterworth & Co., 79 bls.; Ernst Mayer, 84 bls.; G. Schuster, 20 bls.; International Trust Co., 25 bls.; C. Nelson, 41 bls.; William A. Feinberg & Sons, 50 bls.; E. J. Keller Co., 284 bls.; Order, 228 bls.

Miscellaneous Paper Stock—S. Birkenstein & Sons, 144 bls.; Darmstadt, Scott & Courtney, 42 bls.; J. Cohen & Sons, 20 bls.; Milton Snedeker Corp., 109 bls.; F. J. Fawcett, 69 bls.; International Trust Co., 48 bls.; T. D. Downing & Co., 53 bls.; Baring Bros. & Co., 148 bls.

Paper

The United States imported paper to the value of $147,439,758 during the calendar year 1930, registering a substantial decrease as compared with importations of a value of $163,184,327 in the preceding year, according to official records of the U. S. Department of Commerce. Most of the imports last year were, of course, newsprint, receipts of which amounted to 4,559,303,478 pounds of a declared value of $131,800,333, against 4,845,401,341 pounds of a value of $144,492,736 in 1929. Of the newsprint imports last year, 3,978,570,153 pounds of a value of $116,470,307 came from Canada, and 312,372,024 pounds of a value of $8,848,403 from Newfoundland. Other imports included cigarette paper to the value of $4,290,682; paper boxes valued at $1,251,792, and tissue paper to the value of $1,130,184. Wrapping paper imports aggregated in value $439,934, and writing paper imports were valued at $1,094,800.

Paper imports during February continued on the low side, taking the receipts through the port of New York as a criterion. Imports of all kinds of paper at New York last month, these data being taken from manifests of vessels reaching that port during the month and consequently unofficial, were as follows:

Printing—Parsons & Whittemore, 166 reels from Gothenburg, 508 reels Hamburg and 25 rolls Stockholm; C. Steiner, 19 cs. from Bremen and 118 bls. Rotterdam; W. H. Bell, 6,893 rolls from Liverpool, N. S.; Perkins-Goodwin Co., 2,027 reels from Hamburg; F. L. Kraemer & Co., 6 cs. from Havre and 10 cs. Southampton; E. Dietzgen & Co., 99 cs. from Rotterdam and 53 cs. Hamburg; Lunham & Reeve, 443 reels from Helsingfors; Keuffel & Esser Co., 123 rolls from Hamburg; Baldwin Paper Co., 565 reels from Hamburg; P. C. Zuhlke, 37 cs. from Antwerp; Steiner Paper Corp., 47 cs. from Rotterdam; Henschel, Naeve & Co., 13 cs. from Rotterdam; Armour & Co., 69 bls. from Hamburg; Guaranty Trust Co., 72 bls. from Hamburg; Order, 1,154 reels and 123 bls. from Hamburg, 685 rolls and 91 bls. Oslo, 568 rolls and 26 cs. Bremen, and 648 reels Kotka.

Wrapping—D. S. Walton & Co., 41 reels from Gothenburg; H. Reeve Angel & Co., 10 rolls and 12 bls. from Gothenburg; Borregaard Co., 87 reels from Gothenburg; F. L. Kraemer & Co., 147 bls. from Gothenburg; Insight Paper Co., 197 reels from Oslo; Robert Wilson Paper Corp., 36 bls. from Rotterdam and 20 cs. Glasgow; J. P. Heffernan Paper Co., 147 bls. from Antwerp; Sylvania Industrial Corp., 19 bls. from Antwerp; Order, 9 cs. from Southampton.

Cigarette—Standard Products Corp., 245 cs. from Havre; Chase National Bank, 6 cs. from Trieste; Champagne Paper Corp., 394 cs. from Havre; American Tobacco Co., 550 cs. from Bordeaux; Liggett & Myers Tobacco Co., 8 cs. from Bordeaux; DeMauduit Paper Corp., 759 cs. from Havre and 955 cs. St. Nazaire; P. J. Schweitzer, Inc., 2 cs. from Havre and 92 cs. Marseilles; Brown Williamson Tobacco Co., 7 cs. from Southampton; Southern Pacific Line, 3 cs. from Southampton; Order, 89 cs. from Marseilles.

Writing—Order, 5 cs. from Bremen.

Filter—H. Reeve Angel & Co., 76 cs. from Southampton and 8 cs. London; C. Sleicher & Scholl Co., 20 cs. rfom Hamburg; A. Giese & Son, 20 cs. from Hamburg; E. Fougera & Co., 46 cs. from Southampton.

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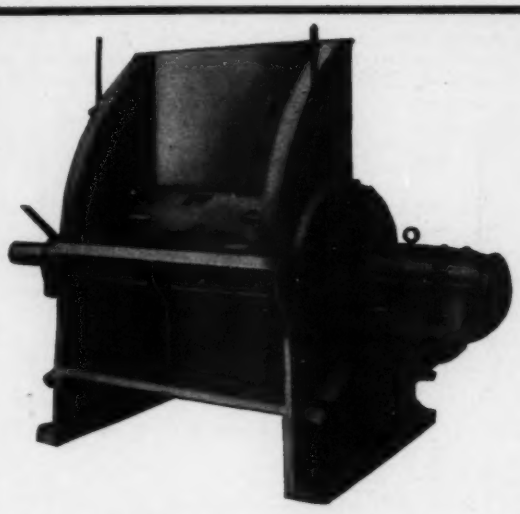

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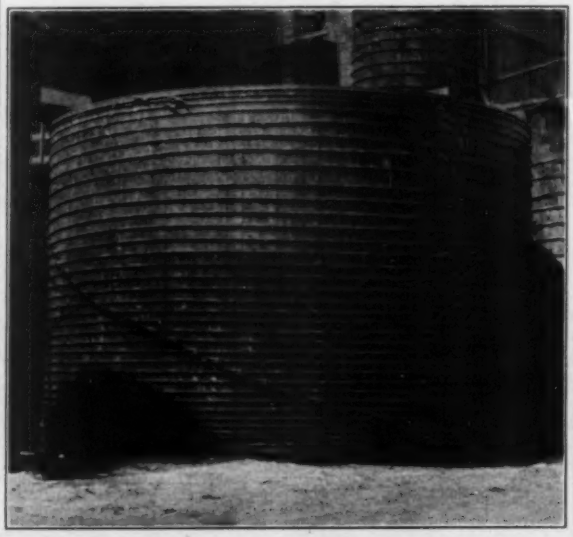
WOOD TANKS TILE



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Drawing—Keuffel & Esser Co., 9 cs. from Rotterdam and 63 cs. Hamburg; H. Reeve Angel & Co., 5 cs. from London; D. F. Young, 2 cs. from Bremen.

Photo—Medo Photo Supply Co., 2 cs. from Southampton; J. J. Gavin & Co., 9 cs. from Southampton; Agfa Ansco Corp., 6 cs. from Southampton; Globe Shipping Co., 119 cs. from Bremen; J. H. Schroder Banking Corp., 43 cs. from Bremen.

Board—H. Fuchs & Son, 26 bls. from Gothenburg; Coty Processing Co., 29 cs. from Havre; A. B. Massa Paper Corp., 1,200 bdls. from Rotterdam; Corbett & Co., 13 cs. from Rotterdam; American Express Co., 152 cs. from Hamburg; Van Oppen & Co., 7 cs. from Hamburg; Lagerloef Trading Co., 101 bls. from Kotka and 69 bls. Helsingfors; Colmar Paper Corp., 30 cs. from Antwerp; Order, 15 bls. from Hamburg.

Miscellaneous—Wells Fargo Express Co., 6 pkgs. from Vera Cruz; L. A. Consmiller, 6 cs. from Bremen; J. H. Schroder Banking Corp., 8 cs. from Bremen; Hensel, Bruckman & Lorbacher, 2 cs. from Bremen and 63 cs. Hamburg; J. E. Bernard & Co., 2 cs. from Gothenburg; Whiting-Patterson Co., 4 cs. from Southampton; Keller-Dorian Paper Co., 65 cs. from Havre, 8 cs. Marseilles and 20 cs. Southampton; Japan Paper Co., 10 cs. from Havre and 2 cs. London; Gerhard & Hey, 30 pkgs. from Havre; C. Bruening, 93 reels from Rotterdam; Heemsoth & Basse, 68 bls. from Rotterdam and 5 cs. Hamburg; J. G. Braun, 5 cs. from Rotterdam; J. Beckhardt & Co., 22 cs. from Rotterdam and 5 cs. Bremen; Miller & Wright Paper Co., 3 cs. from Rotterdam; A. Flinn & Co., 2 cs. from Havre; Pennsylvania Railroad Co., 24 cs. from Hamburg; Meadows, Wye & Co., 6 cs. from Hamburg; Bank of America, 45 cs. from Hamburg; Bermuda & West Indies Steamship Co., 10 cs. from Hamburg; E. Dietzgen & Co., 87 cs. from Hamburg; Kaplan Bros., 17 cs. from Bremen; H. Reeve Angel & Co., 3 bls. from Hamburg; New York Paper Co., 10 cs. from Hamburg; P. Puttmann, 3 cs. from Antwerp; Causon & Montgolfer, 7 cs. from Havre; P. H. Petry & Co., 6 cs. from Havre; Corn Exchange Bank, 29 cs. from Kobe; Bendix Paper Co., 5 cs. from Hamburg; Hoboken Trust Co., 4 cs. from Hamburg; Coenca-Morrison Co., 6 cs. from Havre; Marshall Field & Co., 5 cs. from Havre; D. C. Andrews & Co., 6 cs. from Havre; Thomas & Pierson, 15 cs. from Southampton; W. A. Foster, 6 cs. from Southampton; Hurley-Johnson Co., 45 bls. from Liverpool; Richardson Bros., 4 cs. from Liverpool; S. F. Berliner, 8 cs. from Kobe; F. C. Strype, 8 cs. from Yokohama; F. Murray Hill, Inc., 10 cs. from Bremen; Globe Shipping Co., 101 cs. from Bremen; International Forwarding Co., 53 cs. from Rotterdam and 10 cs. Hamburg; National Freight Forwarding Co., 5 cs. from Hamburg; Universal Carloading & Distributing Co., 5 cs. from Antwerp; Bush Service Corp., 9 pkgs. from Havre; Titan Shipping Corp., 3 cs. from Hamburg.

Company Formed to Handle American Line in Canada

The American Hoist & Derrick Co., of Saint Paul, Minn., and the Dominion Bridge Co., Ltd., and the Dominion Engineering Works, Ltd., of Montreal, Canada, announce the formation of a subsidiary company to manufacture and sell in Canada and the British Empire the American Hoist & Derrick Company's line of power shovels, locomotive cranes, hoists, derricks, "revolvers" (full circle, long boom, large capacity cranes), "Eagle" rail cranes, and the entire American line of hoisting, excavating, and material handling machinery.

The Dominion Hoist & Shovel Co., Ltd., will have the advantage of the American Hoist & Derrick Company's 48 years of experience in designing and building hoisting and material handling machinery and the unexcelled engineering and manufacturing experience of the Dominion Bridge Co., Ltd., and the Dominion Engineering Works, Ltd.

The product of the Dominion Hoist & Shovel Co., will be known as the Dominion line, and will be built and serviced at the Lachine, P. Q. works, near Montreal. All arrangements have been completed and the new line is now actually being manufactured.

The Fifty-Sixth Annual Meeting of The American Forestry Association will be held at Asheville, N. C., June 3, 4, and 5, 1931, it has been announced. The meeting will be held at the Grove Park Inn, jointly with the North Carolina Forestry Association.

The Allied Paper Mills, Kalamazoo, Mich., announces the appointment of Courtney H. Reeves as sales manager of its Chicago office, located in the Daily News Building, 400 W. Madison Street; telephone, Randolph 6011.

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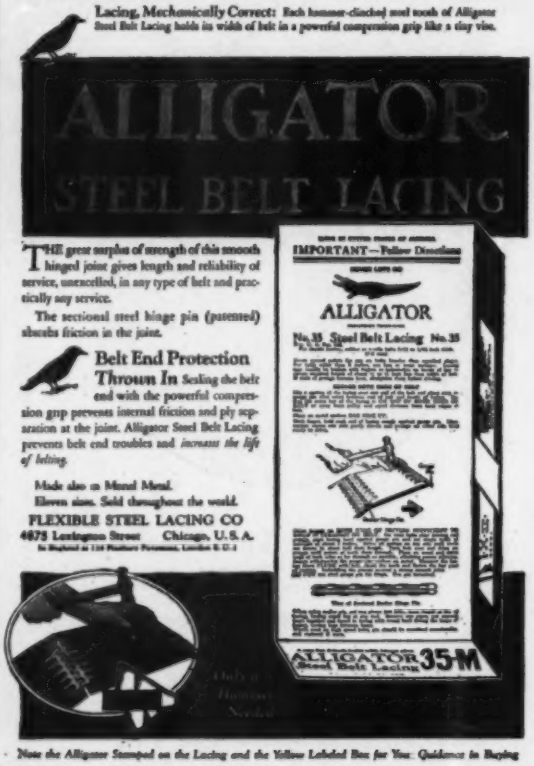

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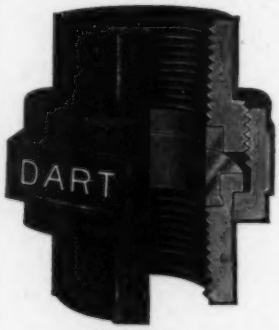

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Foreign Trade Opportunities

The following foreign trade opportunities are issued by the Bureau of Foreign and Domestic Commerce of the United States Department of Commerce. Those interested are requested to communicate with the Bureau at its offices in Washington or New York or its branch offices in other cities, in every case mentioning the number of the inquiries referred to.

No. 49694—Cups, drinking, paper, and boxes and straws for ice cream and soda fountain trade. San Juan, Porto Rico. Agency desired.

No. 49692—Soda ash. Rangoon, India. Purchase desired.

No. 49817—Envelopes and paper. La Paz, Bolivia. Purchase desired.

No. 49820—Fiber board, best quality. Basel, Switzerland. Purchase and agency desired.

No. 49877—Insulating board. Zurich, Switzerland. Agency desired.

No. 49790—Kraft paper and pulp board. Auckland, New Zealand. Agency desired.

No. 49860—Map-printing and land-registration paper. Giza, Egypt. Purchase desired.

No. 49818—Newsprint paper, pulp, writing bond paper, and paper for the printing trade. Sao Paulo, Brazil. Agency desired.

No. 49867—Newsprint and glazed paper. Lima, Peru. Agency desired.

No. 49816—Wood pulp, chemical and mechanical. Milan, Italy. Agency desired.

No. 49819—Waterproof and toilet paper. Brussels, Belgium. Agency and purchase desired.

No. 49854—Wrapping paper and paper bags. Ponce, Porto Rico. Purchase and agency desired.

No. 49845—Writing paper. Cairo, Egypt. Purchase desired.

No. 50070—Fiber sheets, hard. Toronto, Canada. Purchase desired.

No. 50067—Kraft wrapping, woodfree, white and colored bankpost, creamlaid wood-containing, foolscap, ledger, flint, art and imitation art papers, and newsprint paper for flat presses. Singapore, Straits Settlements. Agency desired.

No. 50052—Newsprint paper, and vulcanized fiber. Paris, France. Agency desired.

No. 50140—Roofing paper stock. Bucharest, Rumania. Purchase desired.

No. 50068—Wallboard. Montreal, Canada. Purchase desired.

No. 50210—Paper and wood pulp testing machinery. Stockholm, Sweden. Agency desired.

No. 50179—Paper bags, three and four ply. London, England. Agency and purchase desired.

No. 50220—Wallpaper, and other wall coverings. Amsterdam, Netherlands. Purchase and agency desired.

No. 50186—Writing, printing, banknote, and account book paper. Bombay, India. Agency desired.

Salute to the Paper Industry

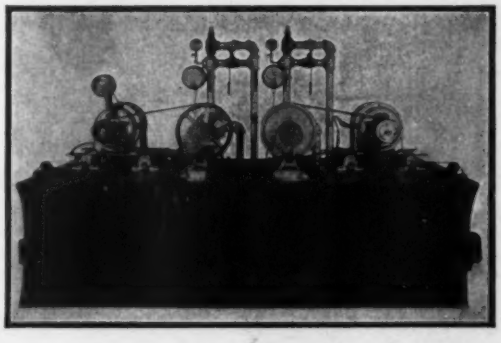
The development of the paper and pulp industry was interestingly revealed to an audience estimated at 20,000,000 in the Westinghouse salute to the paper and pulp industry, which was broadcast through a chain of radio stations, Tuesday evening, February 10.

Sidney L. Willson, president of the American Paper and Pulp Association was the guest speaker. Mr. Willson addressed his audience as follows:

Paper Through the Ages

Since the beginning of time, man has given expression to his thoughts. Long before the origin of paper and of print, history was transmitted orally from father to son and from tribe to tribe. Then came writing on the sands, on stones and on tablets; some of the latter are now in our museums. Later, in response to the need for a less cumbersome material, the skins of goats, skivered into thin sheets called parchment, were used, upon which thoughts were recorded with stains from the juices of vegetables. Paper

DID YOU SEE IT?



A photograph of Houghton's belt demonstrating apparatus exhibited at the recent New York Power Show held at the Grand Central Palace

In a convincing demonstration at the recent New York Power Show, thousands of interested engineers were amazed when they witnessed the ease with which Houghton's flat VIM Leather Belting outpulled rubber- V-belting.

The V-belt isn't a bad belt. It is a worthy competitor and, considering its youth, is doing pretty well. But nevertheless in spite of the goodness of V-belting it falls far short of being the equal of VIM flat leather belting. This has been proven by thousands of tests made by unbiased transmission engineers as well as by the thousands of tests conducted in our own research laboratory and in actual experience on all kinds of drives throughout the world.

We will be pleased to have you conduct similar tests in your own plant comparing VIM Leather Belting with any V-belt made. In fact, we will be glad to have you compare VIM with any other belt, regardless of shape or make. VIM is without question the world's best belt.

Send for your free copy of "The Belt that put the Pull in the PULLEY"—or better yet ask a HOUGHTON Transmission Man to call.

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then followed, essentially like our present medium for recording thoughts.

The word paper comes from the Greek work papyrus, a paper-like material made from a tall reed growing along the Nile. Papyrus was successfully utilized by the Greeks and Egyptians until the seventh century. The Chinese are conceded to be the first manufacturers of paper as we know it today. They developed the art of making paper from the fibrous inner bark of bamboo and mulberry trees, macerated to a pulp which was matted into sheets in hand molds.

The Chinese art, introduced to Damascus by Chinese war prisoners, was carried to Spain by the Moors in the eighth century, and to northern Europe by the Crusaders in the eleventh century, with practically no change in the process. Hand molds for making paper sheet by sheet continued to be used until the nineteenth century. The invention of the paper machine in 1799 completely revolutionized the art of papermaking. It permitted the manufacture of a continuous web of paper which made possible quantity production. With hand molds, mill production was limited to 250 to 500 pounds a day; with the present paper machines, some of which are over 300 inches wide and capable of running 1,200 feet per minute, from 100 to 150 tons of paper can be produced daily.

The daily production of paper on the North American Continent exceeds 40,000 tons, equivalent to the tonnage of a freight train 15 miles long. In the United States the paper and pulp industry ranks seventh among the major industries.

In early times cotton rags were the principal raw material used by papermakers. The natural purity of cotton with its long, tubular fiber ideally suits it for papermaking. Manuscripts of the tenth and eleventh centuries and even earlier bear ample evidence of the permanent character of paper made in early times.

The demands for paper increased rapidly with the introduction of printing presses and similar machines, soon exceeding the supply of rags for papermaking. Widespread search for new and cheaper materials led to the discovery of the processes for pulping wood.

In the 70's, wood pulp began to replace cotton rags in many papers. Today over 8,000,000 tons of wood pulp, together with 5,000,000 tons of other materials, waste paper, straw and jute are used in the making of the 13,000,000 tons of paper consumed in the United States. Rags are still used; from them are made most of our finest papers.

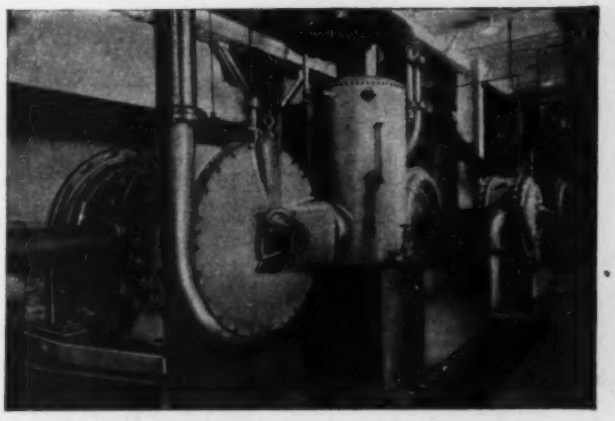
In response to swiftly mounting demand, now exceeding 215 pounds per person each year, the American paper industry has grown with exceeding rapidity. Through the refinement of pulps and with the present mechanical and technical skill which the industry has attracted, all types of paper from coarse boards to the finest writing and book papers are manufactured uniformly well in the United States. We even have one mill where paper of the finest quality is made by hand.

The varieties and uses for paper have increased beyond the wildest thoughts of old-time papermakers, and with them the industry has kept abreast. Paper is now replacing textiles, glass, wood and metals in many every-day commodities, and research in new uses is just under way.

The paper industry welcomes this opportunity to present the story of paper. Paper manufacturers are anxious that you should know more about the many steps in the conversion of raw materials into the finished product. Visit a paper mill; you will be impressed with the enormous capital invested, the great variety and magnitude of equipment necessary, and the skill and care demanded in maintaining the standards, required in the various kinds of paper you use.

A committee representative of the paperboard industry in various sections of the country has been appointed by the Paperboard Industries Association to confer with a similar committee representing the Waste Paper Division of the National Association of Waste Material Dealers, Inc., the purpose of the conference being to consider matters connected with the waste paper industry which are believed to be of interest and importance to the members of both associations. The joint meeting probably will take place shortly after the annual meetings of both organizations which occur during the week of March 16.

11 HYTORS . . . at Ste. Anne's



Jennings Flat Box Pump and one of several Nash Hytors installed at the Ste. Anne Paper Company, Beaupre, Que.

LIKE hundreds of important paper manufacturers, Ste. Anne Paper Company rely on Nash Hytor Vacuum Pumps and other Nash paper mill equipment.

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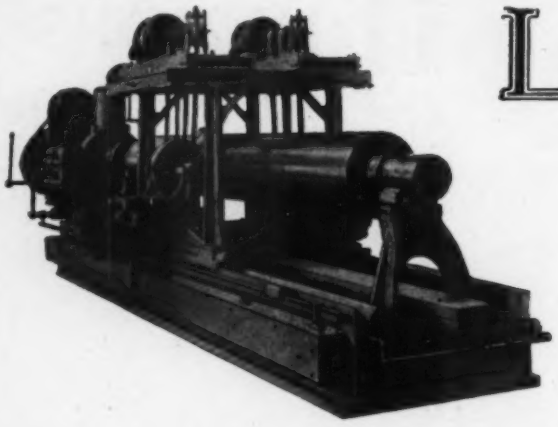

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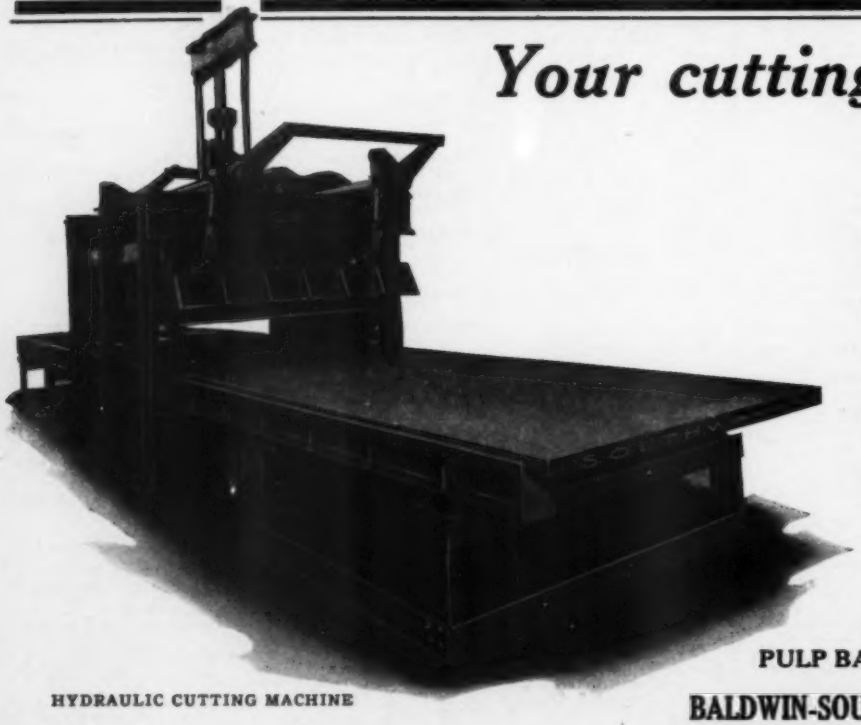

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Appleton Woolen Co.
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Draper Bros. Co.
Fitchburg Duck Mills
F. C. Huyck & Sons
Lockport Felt Co.
Orr Felt & Blanket Co.
Shuler and Benninghofen
Waterbury Felt Co.

Felt and Wire Guides
Moore & White Co.

Felt Cleaning Material
Oakite Products, Inc.

Felt Conditioners
Fidalgo Drying Systems

Felt Drying Systems
J. O. Ross Eng. Corp.

Filter (Continuous Suction)
Oliver United Filters Inc.

Filters (Oil)
S. F. Bowser & Co.

Filters (Pressure & Gravity)
Glens Falls Mach. Works
Graver Tank & Mfg. Corp.
Oliver United Filters Inc.

Filters and Thickeners
Fidalgo Drying Systems
Glens Falls Mach. Works

Fire Extinguishers
Pyrene Mfg. Co.

Fittings (Chrome Nickel)
Alloy Steel Products Co.

Floor Plates (Safety)
J. T. Ryerson & Son, Inc.

Flour Sack Machinery
Smith & Winchester Co.

Flow Meters
Bailey Meter Co.
The Foxboro Co., Inc.
General Electric Co.
Republic Flow Meters Co.

Fly Wheels
Link-Belt Company

Folding Testers
Foreign Paper Mills, Inc.

Folders (Paper)
Norwood Engr. Co.

Fourdrinier Machines
Bagley & Sewall Co., Inc.
The Black-Clawson Co.
Downingtown Mfg. Co.
J. H. Horne & Sons Co.
Smith & Winchester Co.

Freeness Testers
Foreign Paper Mills, Inc.

Friction Calenders
Holyoke Mach. Co.
Norwood Engr. Co.
B. F. Perkins & Sons, Inc.

Gauges (Draft)
Bailey Meter Co.

Gauges (Pressure)
Bailey Meter Co.
The Bristol Co.
Taylor Instrument Co.

Gauges (Thickness)
Foreign Paper Mills, Inc.
B. F. Perkins & Son, Inc.

Gauges (Vacuum)
Taylor Instrument Co.

Gears
The Falk Corp.
Farrel-Birmingham Co.
Holyoke Mach. Co.
The Jeffrey Mfg. Co.
Link-Belt Company
T. B. Wood's Sons Co.

Gears (Fiber)
General Electric Co.

Gears (Herringbone)
Farrel-Birmingham Co.
Link-Belt Company
Terry Steam Turbine Co.

Gears (Silent Chain)
Link-Belt Company

Gears (Worm)
Holyoke Mach. Co.
Link-Belt Company

Generating Sets
Allis-Chalmers Co.
Electric Mach. Mfg. Co.
General Electric Co.
Westinghouse Electric & Mfg. Co.

Generators (Steam)
General Electric Co.
Terry Steam Turbine Co.

Generators (Turbo)
Allis-Chalmers Co.
General Electric Co.
Terry Steam Turbine Co.
Westinghouse Electric & Mfg. Co.

Governors (Pump)
Bailey Meter Co.

Glues
E. F. Russ Co.

Governors (Pump)
General Electric Co.

Grab Buckets
Link-Belt Company

Granite Rolls
B. F. Perkins & Son, Inc.

Grease
Standard Oil Co. (Ind.)
Vacuum Oil Co.

Grease Cups
Link-Belt Company
The Lunkenheimer Co.

Grinders (Pulp)
Glens Falls Mach. Works
Holyoke Mach. Co.

Grinding Wheels
Norton Co.

Hangers
Holyoke Machine Co.
Link-Belt Company
T. B. Wood's Sons Co.

Heaters (Feed Water)
Worthington Pump & Mach. Corp.

Heaters (Open Steam)
Biggs Boiler Works

Heaters (Unit)
Buffalo Forge Co.
J. O. Ross Eng. Corp.

Heaters (United Steam, Fan Blast)
J. O. Ross Eng. Corp.

Heating Systems
Drying Systems, Inc.
J. O. Ross Eng. Corp.

Hoists (Chain)
Maris Brothers, Inc.
Roeper Crane & Hoist Wks., Inc.
J. T. Ryerson & Son, Inc.

Hoists (Electric)
General Electric Co.
Maris Brothers, Inc.
Roeper Crane & Hoist Works
J. T. Ryerson & Son, Inc.

Hoists (Head Gate)
Dayton Best. & Hoist Co.
Holyoke Machine Co.

Hoists (Portable, Air and Steam)
Allis-Chalmers Co.
J. T. Ryerson & Son, Inc.

Hoisting and Conveying Systems
The Jeffrey Mfg. Co.
Link-Belt Company

Hoods (Paper Machine)
Drying Systems, Inc.
J. O. Ross Eng. Corp.

Hose
Boston Woven Hose & Rubber Co.
B. F. Goodrich Rub. Co.
Morey Paper Mill Sup. Co.

Humidity Testers
Foreign Paper Mills, Inc.

Hydrators
Love Brothers, Inc.

Hydraulic Machinery
Baldwin-Southwark Corp.
Holyoke Mach. Co.
Southwark Fdy. & Mach. Co.

Hydrometers
Taylor Instrument Co.

Hygrometers
Foreign Paper Mills, Inc.
Taylor Instrument Co.

Incinerators
The Biggs Boiler Works
Erie City Iron Works
Manitowoc Eng. Works
D. J. Murray Mfg. Co.

Indicators (CO_2, NH_3, SO_2, etc.)
The Bristol Co.

Indicators (Speed)
Foreign Paper Mills, Inc.

Indicators (Super Heat)
Taylor Instrument Co.

Indirect Cooking System
Fibre Making Processes

Iron & Steel Supplies
J. T. Ryerson & Son, Inc.

Jordan Engines
Appleton Machine Co.
Hermann Mfg. Co.
J. H. Horne & Sons Co.
E. D. Jones & Sons Co.
Smith & Winchester Co.

Jordan Fillings
E. D. Jones & Sons Co.

Kettles (Steam Jacketed)
The Biggs Boiler Wks. Co.
Manitowoc Eng. Works

Kraft and Sulphate Pulps
The Borregaard Co., Inc.

Kraft Smelter Brick (Linings)
E. J. Lavino & Co.

Layboys
Moore & White Co.

Leather Belt Cement
Alexander Brothers, Inc.
E. F. Houghton & Co.

Leather Packings
Alexander Brothers, Inc.
E. F. Houghton & Co.

Lubricating Grease & Oils
Standard Oil Co. (Ind.)
Vacuum Oil Co.

Lubricating Systems
S. F. Bowser & Co.

Lubricators
S. F. Bowser & Co.
Eastwood Corporation
The Lunkenheimer Co.

Machine Shop Equipment
J. T. Ryerson & Son, Inc.

Measuring Devices
Foreign Paper Mills, Inc.

Mechanical Draft Apparatus
The Jeffrey Mfg. Co.

Mechanical Pulp
J. Andersen & Co.
The Borregaard Co
Lagerloef Trading Co., Inc.

Metering Systems
Trimbey Mach. Wks.

Meters (Flow)
Bailey Meter Co.
The Foxboro Co., Inc.
General Electric Co.
Republic Flow Meters Co.
Taylor Instrument Co.

Meters (Water)
Worthington Pump & Mach. Corp.

Micrometer Roll Calipers
Farrel-Birmingham Co.
Lobdell Car Wheel Co.

Micrometers (Desk and Pocket)
Foreign Paper Mills, Inc.

Microscopes
Bausch & Lomb Optical Co.
Foreign Paper Mills, Inc.

Motor Cooling
J. O. Ross Eng. Corp.

Motor Generator Sets
Allis-Chalmers Co.
Electric Mach. Mfg. Co.
General Electric Co.
Reliance Elec. & Eng. Co.
Westinghouse Electric & Mfg. Co.

Motors
Allis-Chalmers Co.
Electric Mach. Mfg. Co.
General Electric Co.
Reliance Elec. & Eng. Co.
Westinghouse Electric & Mfg. Co.

Napkin Folders
Hudson-Sharp Mach. Co.
Paper Conv'ting Mach. Co.

Nirosta Metal
Krupp Nirosta Co., Inc.

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Farnsworth Co.

Oils
E. F. Houghton & Co.
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Vacuum Oil Co.

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Opacity Testers
Foreign Paper Mills, Inc.

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E. J. Lavino & Co.

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Hamblet Machine Co.
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Moore & White Co.
B. F. Perkins & Son, Inc.
Smith & Winchester Co.

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H. W. Butterworth & Sons Co.
Holyoke Mach. Co.
Norwood Engr. Co.
B. F. Perkins & Son, Inc.
Textile-Finish. Mach. Co.

Paper Dampeners
Norwood Engr. Co.
B. F. Perkins & Son, Inc.

Paper Distributers
Perkins-Goodwin Co.

Paper Machines
Bagley & Sewall Co., Inc.
The Black-Clawson Co.
Dominion Engr. Works
Downingtown Mfg. Co.
J. H. Horne & Sons Co.
Smith & Winchester Co.

Paper Machine Drives
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General Electric Co.
Link-Belt Company
Westinghouse Electric & Mfg. Co.

Paper Manufacturers
Hammermill Paper Co.
Kalamazoo Veg. Parchment Co.
Mosinee Paper Mills Co.

Paper Manufacturers' Supplies
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The Borregaard Co., Inc.
Diamond Alkali Co.
Lagerloef Trading Co., Inc.
Penn. Salt Mfg. Co.
Perkins-Goodwin Co.

Paper Scales
Foreign Paper Mills, Inc.
B. F. Perkins & Son, Inc.

Paper Testing Machinery
Foreign Paper Mills, Inc.
B. F. Perkins & Son, Inc.

Parchment Manufacturers
Kalamazoo Veg. Parchment Co.

Penstocks
Biggs Boiler Works Co.
Manitowoc Eng. Works

Pillow Blocks
Link-Belt Company
T. B. Wood's Sons Co.

Pipe
Crane Co.
The Duriron Co., Inc.
J. T. Ryerson & Son, Inc.

Pipe (Chrome Nickel)
Alloy Steel Products Co.

Pipe (Riveted Steel)
The Biggs Boiler Works
Taylor Forge & Pipe Wks.

Pipe (Spiral)
Naylor Pipe Co.
Taylor Forge & Pipe Wks.

Pipe (Spiralweld)
Naylor Pipe Co.

Pipe (Steel)
Naylor Pipe Co.
Taylor Forge & Pipe Wks.

Pipe Systems Installed
Pittsburgh Piping & Equipment Co.

Piping Equipment
Crane Co.
Naylor Pipe Co.
Pittsburgh Piping & Equipment Co.
Taylor Forge & Pipe Wks.

Platers
Holyoke Machine Co.
Norwood Engr. Co.
B. F. Perkins & Son, Inc.

Plates (Steel)
J. T. Ryerson & Son, Inc.

Plating (Chromium)
Chromium Corporation of America

Pneumatic Tools
J. T. Ryerson & Son, Inc.

Power Transmission
Allis-Chalmers Co.
Jeffrey Mfg. Co.
Link-Belt Company
T. B. Wood's Sons Co.

Press Rolls
Glens Falls Mach. Works
B. F. Perkins & Son, Inc.

Press Rolls (Granite)
B. F. Perkins & Son, Inc.

Pulleys
Holyoke Mach. Co.
Link-Belt Company
T. B. Wood's Sons Co.

Pulp (Chemical)
J. Andersen & Co.
The Borregaard Co., Inc.
Lagerloef Trading Co., Inc.
Perkins-Goodwin Co.
Pulp & Paper Trad. Co.

Pulp Grinders
Glens Falls Mach. Wks.
Holyoke Mach. Co.

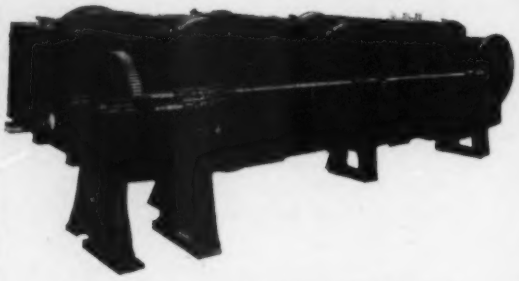
Pulp Presses
Baldwin-Southwark Corp.
Farrel-Birmingham Co.
Southwark Fdy. & Mach. Co.

Pulp Process (Chem.)
Chemipulp Process, Inc.

Pulp Refiners (Howard)
Manitowoc Eng. Works

Pulp Stones
Norton Co.

Pulp Testers
Foreign Paper Mills, Inc.



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Waterous Ltd., Brantford, Ont. Manufacturing Agent

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See pages 346 and 347 in the 1930 Paper and Pulp Mill Catalogue

YES he's knocked out by falling pulp !!

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Oliver United Filters Inc.

Pulpwood Stackers
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Link-Belt Company

Pulverized Fuel Equipment
Erie City Iron Works

Pumping Machinery
Lawrence Mach. & Pump Co.
Lawrence Pump & Engine Co.

Pumps (Boilr. Feed)
De Laval Steam Turb. Co.
Farnsworth Co.
Frederick Iron & Steel Co.
Lawrence Pump & Engine Co.
Worthington Pump & Mach. Corp.

Pumps (Centrifugal)
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Frederick Iron & Steel Co.
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Lawrence Mach. & Pump Co.
Lawrence Pump & Engine Co.
Moore & White Co.
Oliver United Filters Inc.
Smith & Winchester Co.
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Worthington Pump & Mach. Corp.

Pumps (Deep Well)
Worthington Pump & Mach. Corp.

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Glens Falls Mach. Wks.
Lawrence Pump & Engine Co.
Moore & White Co.
Shartle Bros. Mach. Co.
Smith & Winchester Co.
Warren Steam Pump Co.

Pumps (Vacuum)
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Taylor Instrument Co.

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Bevis Machine Co.
Holyoke Machine Co.
B. F. Perkins & Sons, Inc.
Simonds Worden White

Rag and Paper Dusters
Holyoke Mach. Co.

Reclaiming Machinery
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Reclaiming Systems (Oil)
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Recorders (CO_2, NH_3, SO_2, etc.)
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Recorders (Liquid Level)
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Recorders (Specific Gravity)
Bailey Meter Co.

Recording Instruments (Temperature, Pressure, Humidity, Flow.)
Bailey Meter Co.
The Bristol Co.
Foxboro Co., Inc.
Taylor Instrument Co.

Recovery Systems (Soda and Sulphate)
J. O. Ross Eng. Corp.

Reduction Gears
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Link-Belt Company
Terry Steam Turbine Co.

Reels
Moore & White Co.
Smith & Winchester Co.

Reels (Automatic Collapsing)
Hudson-Sharp Mach. Co.

Refiners
Hermann Mfg. Co.
Love Brothers, Inc.

Refractories
Botfield Refractories Co.
E. J. Lavino & Co.

Regulators (Feed Water)
Bailey Meter Co.

Regulators (Pressure and Temp.)
Taylor Instrument Co.

Regulators (Pulp Grinder)
General Electric Co.

Rod Mills
Mine & Smelter Supply Co.

Roll Grinding
Bevis Machine Co.

Roll Grinding Machines
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Lobdell Car Wheel Co.

Rolls
Bevis Machine Co.
H. W. Butterworth & Sons Co.
Downingtown Mfg. Co.
Farrel-Birmingham Co.
Holyoke Mach. Co.
Lobdell Car Wheel Co.
Norwood Engr. Co.
B. F. Perkins & Son, Inc.
Textile-Finish. Mach. Co.

Rolls (Embossing)
B. F. Perkins & Son, Inc.

Rolls (Rubber Covered)
Cincinnati Rub. Mfg. Co.
B. F. Goodrich Co.

Roof Drying Systems
J. O. Ross Eng. Corp.

Rope Drives
Morey Paper Mill Sup. Co.
T. B. Wood's Sons Co.

Rope (Cotton)
Morey Paper Mill Sup. Co.

Rope (Transmission)
Morey Paper Mill Sup. Co.

Rosin Size
Paper Makers Chem. Co.
Western Paper Makers Chem. Co.

Rosin Melters
Manitowoc Engr. Works

Rotaries
Biggs Boiler Works Co.
Manitowoc Eng. Works

Rotary Bleaching Boilers
Biggs Boiler Works Co.
Manitowoc Eng. Works

Rotary Printing Units
Hudson-Sharp Mach. Co.
Paper Conv'ting Mach. Co.

Rust Preventatives
E. F. Houghton & Co.

Safety Treads
J. T. Ryerson & Son, Inc.

Save-Alls
Glens Falls Mach. Works
Moore & White Co.
Oliver United Filters Inc.

Saws
Allis-Chalmers Co.
J. T. Ryerson & Son, Inc.

Scales (Desk and Pocket)
Foreign Paper Mills, Inc.

Screens
Downingtown Mfg. Co.
E. D. Jones & Sons Co.

Screens (Flat)
Fidalgo Drying Systems
Glens Falls Mach. Works

Screens (Rotary)
American Paper Mach. & Eng. Works
Moore & White Co.
Trimbey Mach. Wks.

Screen Diaphragms
B. F. Goodrich Rub. Co.

Screen Plates
Union Screen Plate Co.

Seals (Air)
Edge Moor Iron Co.

Sedimentation Testers
Foreign Paper Mills, Inc.

Shafting
Allis-Chalmers Co.
Link-Belt Co.
J. T. Ryerson & Son, Inc.
T. B. Wood's Sons Co.

Shakes
Bevis Machine Co.

Sheet Metal Work
J. O. Ross Eng. Corp.

Sheets (Iron and Steel)
J. T. Ryerson & Son, Inc.

Shower Pipes
Moore & White Co.
Smith & Winchester Co.

Shredders
Fidalgo Drying Systems
Ryther & Pringle Co.

Silent Chain Drives
The Jeffrey Mfg. Co.
Link-Belt Co.
Morse Chain Co.

Sizing Process
Mansfield, Bolton & Kent

Sizing, Testers
Foreign Paper Mills, Inc.

Slitters
Moore & White Co.

Slitting and Rewinding Machinery
Cameron Machine Co.
Hamblet Machine Co.
Samuel M. Langston Co.

Sluice Gates
Dayton Beat. & Hoist Co.

Soda Ash
Diamond Alkali Co.
Grasselli Chemical Co.
Solvay Process Co.

Special Machinery
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Hudson-Sharp Mach. Co.
E. D. Jones & Sons Co.
D. J. Murray Mfg. Co.
Norwood Engr. Co.
Southwark Fdy. & Mach. Co.

Speed Changes
Moore & White Co.

Speed Reduction Units
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De Laval Steam Turb. Co.
The Falk Corp.
Farrel-Birmingham Co.
Link-Belt Company

Spiral Lock-Seam Pipe
Naylor Pipe Co.

Sprockets
The Jeffrey Mfg. Co.
Link-Belt Co.

Stacks
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Manitowoc Eng. Works

Starch
Corn Prod. Refining Co.

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Shartle Bros. Mach. Co.

Steam Meters
Bailey Meter Co.
Bristol Co., The
Republic Flow Meters Co.

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Bevis Machine Co.
Farnsworth Co.
W. F. Pickles

Steam Separators
Farnsworth Co.

Steel (Bars, Shapes, Plates, Sheets, Etc.)
Joseph T. Ryerson & Son

Steel Plate Construction
Biggs Boiler Works Co.
Erie City Iron Works
Graver Tank & Mfg. Corp.
Manitowoc Eng. Works

Steel Plate Construction (Chrome Nickel)
Alloy Steel Products Co.

Steel Strapping
Signode Steel Strap. Co.

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Westinghouse Electric & Mfg. Co.

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Biggs Boiler Works Co.
Erie City Iron Works

Strapping (Steel)
Signode Steel Strap Co.

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Moore & White Co.

Stuff Pumps
Moore & White Co.

Suction Boxes
Bevis Machine Co.
Black-Clawson Co.
Dominion Engr. Works
Norwood Engr. Co.

Sulphite (Strong Bleached and Easy Bleaching)
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Perkins-Goodwin Co.

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Biggs Boiler Works Co.
Manitowoc Eng. Works

Sulphite Fittings
Eastwood Corporation

Sulphite Machinery
Biggs Boiler Works Co.
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American Paper Mach. & Eng. Works
Glens Falls Mach. Works

Supercalenders
Holyoke Mach. Co.
Norwood Engr. Co.
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Erie City Iron Works
Graver Tank & Mfg. Corp.
Manitowoc Eng. Works

Tanks (Oil)
Biggs Boiler Works Co.
The Lunkenheimer Co.

Tanks (Paint)
Biggs Boiler Works Co.

Tanks (Jacketed)
Biggs Boiler Works Co.
Manitowoc Eng. Works

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Kalamazoo Tk. & Silo Co.
New England Tank & Tower Co.
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B. F. Goodrich Rub. Co.

Tensile Strength and Stretch Testers
Foreign Paper Mills, Inc.
B. F. Perkins & Son, Inc.

Testers (Bursting Strength)
B. F. Perkins & Son, Inc.

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Foreign Paper Mills, Inc.

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Taylor Instrument Co.

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Holyoke Mach. Co.
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Norwood Engr. Co.

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Hudson-Sharp Mach. Co.

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Link-Belt Co.

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J. T. Ryerson & Son, Inc.

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Turbines (Hydraulic)
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Holyoke Mach. Co.

Turbine (Steam)
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De Laval Steam Turb. Co.
General Electric Co.
Terry Steam Turbine Co.
Westinghouse Electric & Mfg. Co.

Unions
Crane Co.
E. M. Dart Mfg. Co.
Eastwood Corporation
The Lunkenheimer Co.

Valves
Crane Co.
The Duriron Co., Inc.
Eastwood Corporation
Lunkenheimer Co., The
Merco Nordstrom Valve Co.
Trimbey Mach. Wks.

Valves (Chrome Nickel)
Alloy Steel Products Co.

Valves (Digester)
Eastwood Corporation

Valves (Electrically Operated)
Cutler-Hammer, Inc.
General Electric Co.
The Lunkenheimer Co.

Valves (Gate)
The Lunkenheimer Co.

Valves (Non-return; Emergency Stop)
The Lunkenheimer Co.

Valves (Quick Opening)
Eastwood Corporation
The Lunkenheimer Co.

Valves (Relief)
The Lunkenheimer Co.

Valves (Stock)
Eastwood Corporation

Valve Balls and Discs
B. F. Goodrich Rubber Co.

Valve Specialties
Eastwood Corporation
The Lunkenheimer Co.

Vapor Absorption Systems
Buffalo Forge Co.
Drying Systems, Inc.
J. O. Ross Eng. Corp.

Vats (Steel)
Biggs Boiler Works Co.

Ventilating Fans
Buffalo Forge Co.
B. F. Perkins & Son, Inc.

Ventilating Systems
Buffalo Forge Co.
Drying Systems, Inc.
The Jeffrey Mfg. Co.
J. O. Ross Eng. Corp.

Voltmeters
The Bristol Co.

Vulcanizers
Biggs Boiler Works Co.

Washing Drums
Manitowoc Eng. Works

Waste Heat Recovery Systems
Edge Moor Iron Co.

Water Filters
Glens Falls Machine Co.
Graver Tank & Mfg. Corp.
Norwood Engr. Co.

Water-Softening and Purifying Systems
Graver Tank & Mfg. Corp.

Water Walls
Edge Moor Iron Co.
Erie City Iron Works
Springfield Boiler Co.

Water Wheels
Allis-Chalmers Co.
Holyoke Machine Co.

Wattmeters
The Bristol Co.

Wet Machines
Downingtown Mfg. Co.
Fidalgo Drying Systems
Glens Falls Machine Wks.
Smith & Winchester Co.

Whistles
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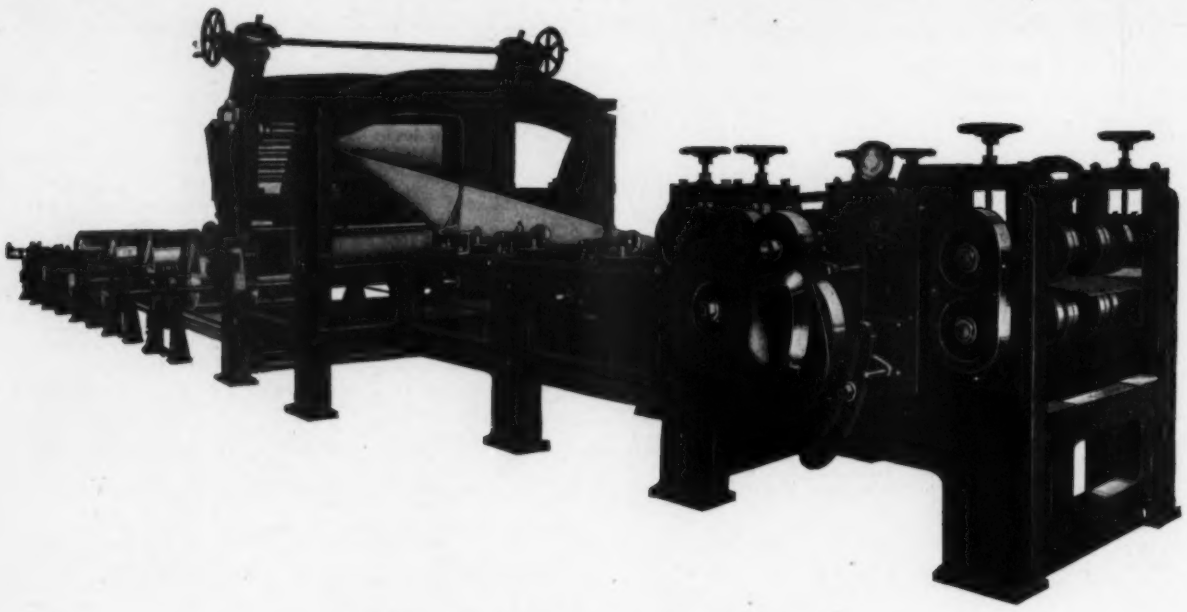
PAPER BAG MACHINERY



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For production of sewn bags, with intucked sides, with one up to five walls in thickness.

Modern in construction. All bearings of ball or roller type, entirely enclosed.

The tubes made on the Multi Wall Tuber meet the severest tests of perfection and production.

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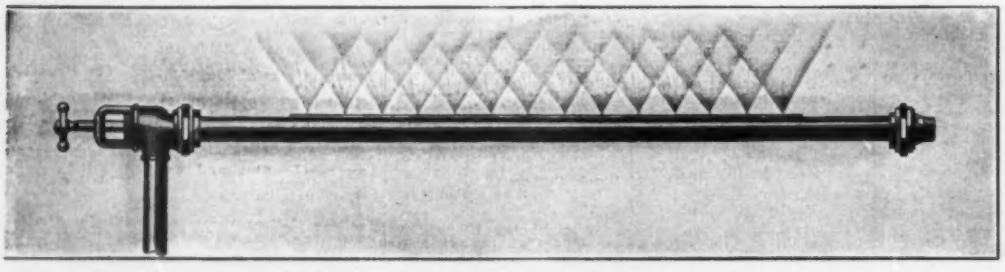

The Rain Storm Shower Pipe

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ESTABLISHED 1845

South Windham, Conn.

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The U-BAR Barking Drum

The U-BAR drum provides an economical means of barking both logs and slabs. It has a large capacity, due to the rough interior, the speed of the drum and dependability of operation. U-BARS bark thoroughly, yet do not injure the wood. The minimum speed of a 10 ft. drum is 7½ r.p.m. and is often increased to 10 r.p.m. Installations are guaranteed for 2 yrs. or 6,000 operating hours at 7½ r.p.m. The durability of the drum, chains, sprockets, take-ups and traction wheels, all especially designed, assures continuous operation and maximum output.

U-BAR drums are manufactured in Canada and Newfoundland by the Horton Steel Works Limited, Bridgeburg, Ontario.

Giant Nekoosa Bark Press

Thousands of pounds of steam are produced yearly from bark pressed by Giant Nekoosa installations. It reduces the water in wet bark, which otherwise would be a nuisance, to 55 per cent almost natural water content. This press is of rugged construction and has a low operating and maintenance cost. Bark from your drums feeds into the hopper. The plunger, armed with cutters for shearing off overflow, rams the bark into a compressing chamber and the water is squeezed out through holes in the walls. The pressed bark may be pushed through spouts to furnaces.

The Giant Nekoosa Bark Press is also used for pressing screenings where same are, for instance, put back in the digester or transported to another mill. It can also be used for pressing kraft pulp in connection with washing same, thus eliminating diffusers.

Get information about the recent improvement which has been made in the pressing chamber, which has reduced the power consumption considerably.

The F. M. P. Coarse Screen

The F. M. P. Coarse Screen is equally effective on groundwood and chemical pulp. With the fine perforations used more impurities are removed at the beginning of the cycle, therefore relieving the fine screens and saving screen plates.

With its gravity feed the screenings are gently rolled, showered and rejected, no breaking up action takes place and the result is clean stock.

By baffle arrangement inside the screen the rejects are retained under a concentrated shower during six revolutions, therefore, rejects are free from good fibres.

The 5' Dia. x 12' Long screen has a capacity on groundwood of 100 tons per 24 hours with $\frac{1}{16}$" perf. and 65 tons chemical pulp with ¼" perf. For this great capacity only 1.16 H.P. is used.

The screen is supplied with direct connected motor, and enclosed self-lubricating speed reducer, therefore, countershaft, belt, etc., are eliminated.

Morterud System of Indirect Cooking

The Morterud System of indirect cooking with positive circulation increases the quality of the pulp and reduces waste. Steam heats the liquor in a heater instead of being allowed to enter the digester. A high grade of pulp is produced, as the liquor is forced through the heater and spread evenly through the digester. Cooking time is reduced, as the pressure and temperature are brought up quickly. The liquor is not diluted and less steam and equipment in recovery room is possible. The steam condensate may be pumped back into the boilers.

Sulphate pulp tests show 200% breaking strength in 120 minutes beating time.

We will be pleased to send you information, blueprints or quotations, on any of these products.

FIBRE MAKING PROCESSES, INC.

Willoughby Tower, Chicago, Illinois, U. S. A.